

THE PREVENTION OF PEDIATRIC OBESITY DURING PREGNANCY:
A PILOT STUDY

by

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Masters Thesis submitted to the faculty of the
Department of Medical and Clinical Psychology
Graduate Program of the Uniformed Services University
of the Health Sciences in partial fulfillment
of the requirements for the degree of
Master of Science, 2011



UNIFORMED SERVICES UNIVERSITY, SCHOOL OF MEDICINE GRADUATE PROGRAMS
Graduate Education Office (A 1045), 4301 Jones Bridge Road, Bethesda, MD 20814



September 24, 2012

APPROVAL SHEET

Title of Dissertation: **"The Prevention of Pediatric Obesity During Pregnancy: A Pilot Study"**

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A handwritten signature in black ink, appearing to read 'N. Steele', with a stylized, cursive script.

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ABSTRACT

Title of Thesis: The Prevention of Pediatric Obesity During Pregnancy: A
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American children are becoming increasingly overweight. The prevalence of childhood obesity has tripled in recent decades. Obesity during childhood places youth at high risk for poor health outcomes as adults. Factors associated with the prenatal and early infant environment are some of the earliest predictors of excessive weight gain in children that have been studied. Both excess and insufficient maternal prenatal weight gain have been associated with adverse cardiometabolic outcomes in late childhood and adulthood. Factors associated with childhood weight gain include maternal weight gain during pregnancy (either too much or too little), weight gain during the first 6 months of life, and parental feeding behaviors after birth. Indeed, pregnant women may ‘program’ their child’s metabolism during the time that the child is a fetus. By targeting these early risk factors, the prevalence of pediatric overweight may be reduced. First-time pregnant women ($N = 8$) voluntarily participated in a 6-session counseling intervention designed to prevent pediatric obesity. The intervention appeared to be feasible, acceptable to participants, and contribute to healthy weight gain in women and healthy birth weight in infants.

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INTRODUCTION

1. Defining the Obesity Problem

1.1. Obesity is a Public Health Concern

Overweight and obesity have become significant public health concerns over the past decade (Barlow, 2007). Recent studies show that obesity, in both adults and children, is currently at an historical high in the United States (Ogden, et al., 2006). According to data obtained from the National Health and Nutrition Examination Survey (NHANES), the prevalence of overweight and obesity have been increasing over the past three decades (Ogden, et al., 2006; Ogden, Carroll, & Flegal, 2008). From 1980 to 2002, obesity prevalence in the U.S. doubled in adults ages 20 years or older, and overweight prevalence tripled in children ages 6 to 19 years (Ogden, et al., 2006). In 1999-2002, 62% of U.S. women ages 20 years or older were overweight, 33% were obese, and 15% of girls ages 12 to 19 years were overweight (CDC, 2006). And it was estimated that in 2005, 1.6 billion people worldwide ages 15 years or older were overweight, and that 400 million people were obese (CDC, 2006).

Without intervention, it is projected that by the year 2030, 86% of U.S. adults will be overweight or obese, and that 51% will be obese (Wang et al., 2008). By 2048, it is estimated that all U.S. adults will be overweight or obese if current trends continue (Wang et al., 2008). Adults are not the only age group affected by obesity. An increasing number of children are obese compared to previous decades (Ogden, et al., 2006). In 2003-2004, 32% of U.S. children were overweight and 17% were obese (CDC, 2006). Research shows that it is the heaviest children who have become heavier (CDC, 2006). Currently in the U.S., 34% of children are obese or overweight (CDC, 2006), with an increasing percentage

of children under the age of 4 years having BMIs at or above the 95th percentile (CDC, 2006). Even the youngest of children are affected by the rising rates of obesity. Strauss and Pollack (2001) found that the prevalence of obesity among 2- to 5- year old U.S. children increased from 10% to 14% from 1999 to 2004 (CDC, 2006). In contrast to the trend for adults, half of children will be overweight by 2070, assuming current trends persist (Wang et al., 2008). Being overweight as a child puts one at risk for obesity in adolescence and adulthood (Field, Cook, & Gillman, 2005) and increases rates of morbidity and mortality (Freedman et al., 2004). Obesity has been shown to place both children and adults at increased risk for health problems, including hypertension, type 2 diabetes, sleep apnea (Weiss et al., 2004), orthopedic disorders, and skeletal problems (Taylor et al., 2006). In the U.S., as well as worldwide, obesity is a leading preventable cause of death and it is estimated that 400,000 deaths in the U.S. annually are associated with obesity-related conditions (Mokdad, Marks, Stroup, & Gerberding, 2005).

The increasing prevalence of obesity is related to medical expenditures and indirect productivity losses estimated to exceed 75 billion dollars annually in the U.S. (Finkelstein, Fiebelkorn, & Wang, 2004). It is estimated that total health care costs attributable to overweight and obesity would double every decade to 860–956 billion dollars in the U.S. by 2030 (Wang et al., 2008). Moreover, obesity is difficult to treat throughout one's life (Trasande et al., 2009). Weight loss is possible, but long-term maintenance of weight loss is difficult, which is why it is critical to develop strategies aimed at the prevention of obesity early in life (Plourde, 2006).

1.2. Definition of Obesity

In order to treat and/or prevent overweight and obesity, clear definitions of the conditions must exist. Obesity is defined as the accumulation of excess body fat to the extent that it may have adverse effects on health (CDC, 2006). Body fat mass is estimated by calculating body mass index (BMI) (CDC, 2006). BMI provides a measurement of weight relative to height and is defined as one's weight in kilograms divided by one's height in meters squared (CDC, 2006). BMIs range from under 18.5 kg/m^2 (underweight) to over 40 kg/m^2 (morbidly obese). A BMI in the range of 18.5 to 24.9 kg/m^2 is defined as non-overweight and overweight is defined as having a BMI in the range of 25 to 30 kg/m^2 . Obesity is defined as having a BMI $> 30 \text{ kg/m}^2$.

BMI is the standard criterion for measuring obesity in adults, and for children, BMI provides a uniform measure across age groups (CDC, 2006). A shortcoming of BMI is that it does not differentiate between body muscle mass and fat mass and therefore is not a direct measure of obesity (Barlow, 2007). Specifically, if an individual has high muscle mass, he or she would also have a correspondingly high BMI. However, BMI has been shown to be a valid indicator of amount of body fat mass (Mei et al. 2002) as well as of cardiovascular health risks (Freedman, Khan, Dietz, Srinivasan, & Berenson, 2001). BMI is most widely used because it is easily calculated (Barlow, 2007), it is the best tool available from a broad-based health policy perspective (Barlow, 2007), and it is highly related to both percentage body fat and total body fat (CDC, 2006).

For children, BMI adjusted for age and sex are used (CDC, 2006). Instead of cut-offs for underweight and overweight, the BMI percentile provides a comparison with children of the same sex and age (CDC, 2006). In children ages 2 to 19 years, being at risk

for overweight (which corresponds to an adult BMI of 25 kg/m^2) is defined as having a BMI greater than or equal to the 85th percentile but less than the 95th percentile of the sex-specific BMI for age growth charts (Ogden et al., 2002). Children are categorized as overweight if their BMI is at or above the 95th percentile, which corresponds to an adult BMI of 30 kg/m^2 (Ogden et al., 2002). Research shows that the sensitivity of BMI of $\geq 85^{\text{th}}$ percentile for identifying children at risk for overweight is good, in spite of the fact that the distribution of BMI in children changes with age (Field, et al., 2005).

2. Adverse Physical and Psychological Health Correlates of Obesity

2.1. Adverse Physical Health Correlates of Obesity

The high prevalence of overweight and obesity in children is a concern because of the adverse physical and psychological health correlates. Obesity adversely impacts every organ system in the body (Barlow, 2007). It has been associated with conditions such as chronic inflammation, increased blood clotting tendency, endothelial dysfunction, and hyperinsulinemia (Plourde, 2006). Obesity is associated with increased skin infections, such as acanthosis nigricans, which was found to be present in about 10% of obese white children and about 50% of obese black children in the U.S. (Nguyen et al., 2001). The presence of acanthosis nigricans was found to diminish with weight loss (Nguyen, et al., 2001). In addition, morbidly obese children and adults are at increased risk of chronic irritation and infections in the folds of the skin, particularly in the lower abdomen and armpit, at times requiring systemic antibiotic therapy (Nguyen, et al., 2001).

Overweight and obese children are at increased risk of medical conditions affecting cardiovascular health, such as hypertension, hypercholesterolemia, and dyslipidemia (Eissa

& Gunner, 2004; Elliott, Copperman, & Jacobson, 2004; Lobstein, Baur, & Uauy, 2004). Obesity in adolescents and adults was positively correlated with the presence of asymptomatic coronary atherosclerosis (Ebbeling, Pawlak, & Ludwig, 2002). A study found that 58% of overweight 5- to 7- year old U.S. children have one cardiovascular risk factor or an elevated insulin level, and more than 25% have two or more risk factors (Goran, Ball, & Cruz, 2003). Another study reported that approximately 13% of overweight children have elevated systolic blood pressure and about 9% have elevated diastolic blood pressure (Freedman, et al., 2001). In addition, abnormal lipid levels, including high cholesterol, high triglyceride, and high low-density lipoprotein levels, are common obesity-related medical conditions in U.S. children and adults (Freedman, et al., 2001).

Type 2 diabetes is one of the most serious complications of pediatric obesity because of the deleterious and complex outcomes. Insulin resistance, which increases the risk of developing cardiovascular disease and type 2 diabetes, has been seen in children as young as age 5 years (Ebbeling, et al., 2002). Sinha et al. (2002) found that impaired glucose tolerance, which is a prediabetic condition, is seen in 20% to 25% of obese U.S. children. Type 2 diabetes was rarely seen in children until recently, and it now accounts for as many as half of all new diagnoses of diabetes (Ebbeling, et al., 2002). Increased prevalence of type 2 diabetes increases the risk for diabetic complications such as heart disease, stroke, limb amputation, kidney failure, and blindness (Ebbeling, et al., 2002). According to Goran et al. (2003), in the U.S., some populations of obese children ages 6 to 17 years observed newly diagnosed cases of diabetes that increased from 4% in 1990 to 45% in 2001.

2.2. Adverse Psychological Health Correlates of Obesity

In addition to the physical health conditions associated with overweight and obesity, there are also adverse psychological health correlates in youth. Overweight children and adolescents are at greater risk of social and emotional problems compared to non-overweight children and adolescents (Hughes, Farewell, Harris, & Reilly, 2007; Williams, Wake, Hesketh, Maher, & Waters, 2005). Several studies indicate that children who are overweight experience more anxiety and depressive symptoms, more externalizing symptoms, and greater general psychological distress compared to non-overweight children (Crow, Eisenberg, Story, & Neumark-Sztainer, 2006; Csabi, Tenyi, & Molnar, 2000; Epstein, Klein, & Wisniewski, 1994; Pesa, Syre, & Jones, 2000; Tanofsky-Kraff et al., 2004). Overweight children also report experiencing poor self-esteem and social discrimination (Davidson & Birch, 2001). Self-esteem, especially related to physical appearance, tends to decline in overweight children as they grow into adolescence (Israel & Ivanova, 2002).

Adolescents experience declining degrees of self-esteem associated with sadness, loneliness, nervousness, and high-risk behaviors related to overweight and obesity (Strauss, 2000). It has been shown that children as young as age 5 years can develop a poor self-image in response to negative attention to their weight (Davison & Birch, 2001). Perhaps contributing to their low self-esteem, obese children and adolescents may be stereotyped as unhealthy, academically unsuccessful, socially inept, unhygienic, and lazy, leading to social discrimination and stigmatization (Hill & Silver, 1995).

Overweight adolescents are more likely than non-overweight adolescents to report higher rates of eating pathology, including disordered eating behaviors and cognitions

(Boutelle, Neumark-Sztainer, Story, & Resnick, 2002; Erermis et al., 2004; Neumark-Sztainer et al., 2002; Neumark-Sztainer et al., 1997). Several studies have cited higher prevalence of binge eating among overweight youth compared to non-overweight youth (Decaluwe & Braet, 2003; Decaluwe, Braet, & Fairburn, 2003; Tanofsky-Kraff, et al., 2004). Research has shown that binge eating among treatment-seeking overweight youth appears to be higher (Decaluwe & Braet, 2003; Glasofer et al., 2007) than among population-based samples. The prevalence of binge eating has been shown to range from about twenty to almost sixty percent in samples of treatment-seeking overweight adolescents (Britz et al., 2000; Glasofer, et al., 2007; Isnard et al., 2003).

Obesity may negatively impact on health-related quality of life (HRQOL) in youth (Tsiros et al., 2009). The World Health Organization defines HRQOL as quality of life associated with physical, mental, and social well-being (Williams, et al., 2005). Research has shown that there is an inverse relationship between BMI and HRQOL, and that HRQOL improves with weight loss in both children and adults (Karlsson, Taft, Ryden, Sjostrom, & Sullivan, 2007). Numerous studies have reported that physical and social functioning in children and adults are most affected by overweight and obesity (Hughes, et al., 2007; Tyler, Johnston, Fullerton, & Foreyt, 2007; Varni, Limbers, & Burwinkle, 2007; Williams, et al., 2005). Studies have provided evidence of a strong inverse relationship between BMI and physical functioning as well (Arif & Rohrer, 2006; Ingerski, Janicke, & Silverstein, 2007; Zeller & Modi, 2006). Research indicates that obese children and adolescents have reduced overall HRQOL compared to their non-obese counterparts (Schwimmer et al., 2003), and that HRQOL of severely obese adolescents was equal to HRQOL of adolescents with cancer (Fallon et al., 2005).

3. Individual Behavioral Risk Factors for Obesity

The increased prevalence of obesity, along with the adverse health correlates, has led researchers to try to understand what individual behavioral factors promote excess weight gain in children. Television viewing and dietary choices have received the most attention (Nelson, Gordon-Larsen, North, & Adair, 2006; Plourde, 2006; Raynor, Jelalian, Vivier, Hart, & Wing, 2009; Trost, Kerr, Ward, & Pate, 2001). According to Strauss and Pollack (2001), the availability of and interest in sedentary activities (e.g., viewing television, using computers, playing video games) has increased to the extent that U.S. children currently spend 75% of their waking hours engaging in sedentary activities and spend only 12 minutes per day engaging in vigorous physical activity (Strauss & Pollack, 2001). Lack of physical activity, excessive inactivity, and excessive sedentary activity are associated with pediatric obesity (Trost, et al., 2001). Excess weight gain in childhood and adolescence has been associated with increased participation in sedentary activities because sedentary activities promote decreased energy expenditure (Epstein, Roemmich, Paluch, & Raynor, 2005). Trost et al. (2001) showed that children who engage in the least vigorous physical activity tend to be the most overweight, and that obesity risk decreases by 10% for each hour per day of moderate-to-vigorous physical activity.

3.1. Television Viewing

Inactivity and television viewing tend to go hand-in-hand. One of the reasons for recent increased television viewing among children and adolescents is the fact that more youth have a television in their bedroom (Wiecha et al., 2001). Wiecha et al. (2001) found that having a television in the bedroom increases television viewing by 38 minutes per day. The amount of television watched is associated with the risk of pediatric overweight

(Kautiainen, Koivusilta, Lintonen, Virtanen, & Rimpela, 2005; Ma, Li, Hu, Ma, & Wu, 2002). Hernandez et al. (1999) found that the risk of pediatric obesity increases by 12% for each hour per day of television viewing. Children of ages 10 to 15 years who spend five hours per day watching television are five times more likely to be overweight as those watching less than two hours per day (Plourde, 2006).

According to Epstein et al. (2002), television viewing significantly impacts obesity risk because it appears to both decrease physical activity as well as affect the food choices children make. While watching television, children tend to increase consumption of calorie-dense, high-fat, high-carbohydrate foods. In a study by Coon et al. (2001), children not only consumed more meals while watching television, they also increase their intake of calorie-dense foods, and decrease their intake of vegetables in direct proportion to the amount of time they spend watching television. Epstein et al. (2002) found that children are more likely to passively consume excessive amounts of calorie-dense foods high in fat and carbohydrates while watching television than during other activities.

Television advertising may also adversely affect dietary preferences and patterns in children, who are exposed to approximately ten food commercials per hour of television viewing, most of which are targeted toward youth and advertise fast food, soft drinks, sweets, and sugar-sweetened breakfast cereals (Ebbeling, et al., 2002). Commercials for products targeting youth are colorful and portray fun activities and lifestyles. Many food products that are marketed especially toward children are packaged with appealing cartoon characters that attract children (Borzekowski et al., 2001). This is problematic since exposure to such advertisements may translate into consumption. Borzekowski et al.

(2001) found that exposure to a 30-second commercial increases the likelihood that 3- to 5-year old children would later select an advertised food when presented with options.

Research provides evidence that total energy intake is about 10% greater in school-age children who consume sugar-sweetened soft drinks compared to those who do not (Ludwig, Peterson, & Gortmaker, 2001). Furthermore, soft drink consumption tripled from 1978 to 1994 and now makes up about 8% of adolescents' total energy intake (Plourde, 2006).

3.2. Dietary Choices

Food selection that increases overall energy intake is associated with overweight and obesity in school-aged children. These eating behaviors include the following: greater intake of sweetened drinks (e.g., carbonated beverages, fruit juice) (Malik, Schulze, & Hu, 2006), greater consumption of fast food (Nelson, et al., 2006), more energy-dense snack food intake (Nicklas, Yang, Baranowski, Zakeri, & Berenson, 2003), less frequent breakfast consumption (Barton et al., 2005), fewer meals eaten together as a family (Gable, Chang, & Krull, 2007), lower intake of dairy servings (Barba, Troiano, Russo, Venezia, & Siani, 2005), and increased consumption of larger portion sizes of food (Ebbeling et al., 2002). Consuming large portion sizes of food results in excessive caloric intake which increases the risk for overweight in children and adults (Ebbeling et al., 2002). Research estimates that excess weight can be gained by children and adults when they consume as little as an additional 150 calories per day without a compensatory increase in energy expenditure (Ebbeling et al., 2002).

The food choices children make are of great concern in reducing obesity because of the direct dietary links between macronutrients and body weight. Fat, the most energy-

dense macronutrient, appears to directly contribute to obesity and obesity-related conditions (Salmeron et al., 2001). Partially hydrogenated (trans) fats (found in calorie-dense snack food) increase the risk of both cardiovascular disease and type 2 diabetes (Salmeron, 2001), and saturated fats (found in certain oils, dairy products, beef, fast food, and restaurant food) increase the risk of cardiovascular disease (Salmeron, 2001). In contrast, unsaturated fats (found in vegetables and grains) decrease the risk of cardiovascular disease and type 2 diabetes (Salmeron, et al., 2001). A diet high in carbohydrates that have a high glycemic index (e.g., sugar, white bread, potato, corn flakes) has been linked to the risk for central adiposity, cardiovascular disease, and type 2 diabetes in children and adults (Toeller et al., 2001). The increased consumption of high glycemic index foods produces an elevation in blood glucose concentrations which can stimulate hunger and overeating (Ludwig et al., 1999).

Data suggest that children consume more energy-dense meals when they eat in restaurants compared to home, possibly because restaurants tend to serve larger portions of energy-dense foods (Zoumas-Morse, Rock, Sobo, & Neuhouser, 2001). A single meal from some restaurants often contains enough calories to satisfy a person's caloric requirement for an entire day. Despite some of their recent healthful offerings, restaurants still tend to include foods high in fat, sugar, and calories and low in fiber and nutrients. Repeated exposure to larger portion sizes may also help explain why, as children grow older, they become increasingly less responsive to internal hunger and satiety cues and more reactive to environmental stimuli (Rolls, Engell, & Birch, 2000). Rolls and colleagues (2000) found that 2- to 5- year old children consume the same amount of food

regardless of the portion size, whereas 4- to 6- year old children consume more food when given a large versus small portion.

Studies show that fast food consumption in the U.S. has increased over the past three decades (Binkley, Eales, & Jekanowski, 2000; French, Harnack, & Jeffery, 2000). Research suggests an association between fast food consumption and body weight. Youth who consume fast food twice each week and spend at least 2.5 hours per day watching television have triple the risk of both obesity and abnormal glucose levels compared to youth who consume fast food once or less per week and watch no more than 1.5 hours of television per day (French, Story, Neumark-Sztainer, Fulkerson, & Hannan, 2001). French et al. (2001) found that adolescent girls who consume fast food four times per week or more consume about 185-260 calories more per day than those who did not consume fast food.

4. Obesity Treatment

If the current trend continues, the number of obese children and adults will continue to increase in the coming years. Unfortunately, the large number of adults who are overweight or obese directly contributes to the number of children becoming overweight and obese (Plourde, 2006). Obese parents are likely to have obese children, and there is evidence to suggest that this will be the first generation not to outlive their parents (Olshansky et al., 2005). Increasing rates of obesity in children and adults result in greater likelihood of developing physical and psychological conditions associated with the condition. Importantly, many of these associated conditions disappear when weight is lost (Nguyen, et al., 2001).

Much attention has been devoted to understanding how to treat obesity with the goal of improving long-term health and functioning in children and adults. Despite efforts, however, obesity treatment has had limited success with achieving and maintaining weight loss. Behavior-based weight loss and subsequent weight management are difficult, and medication and surgery are expensive and may have potentially adverse side effects (Barlow, 2007). Weight loss tends to be limited and short-lived, and individuals are at increased risk of relapse especially when predisposition to obesity is established early in life (Plourde, 2006).

4.1. Genetic Impact on Obesity

Weight loss is often difficult (Gluckman, Hanson, Cooper, & Thornburg, 2008). Even when weight reduction is successful, weight loss is rarely maintained (Trasande et al., 2009). Genetics contributes importantly to one's body weight and impacts weight loss maintenance following treatment. An obese mother may not only predispose her children to obesity, but may even impact the weight of her grandchildren. According to Gluckman et al. (2008), the risk of obesity may be influenced by an intergenerational transfer of environmental information that predisposes the adult to obesity and disease. The genetic predisposition is passed on to the following two generations and impacts the health of subsequent generations, possibly through the continued transfer of environmental information through the placenta and breast milk. Drake et al. (2005) found that exposure during pregnancy to glucocorticoids in rats results in altered expression of liver enzymes, elevated blood pressure, and endothelial dysfunction in the first generation offspring, and the changes are transmitted to the second generation. Although this phenomenon is more

difficult to study in human beings, research suggests that there is reason for concern because similar mechanisms exist in human beings (Gluckman et al., 2008).

4.2. Obesity Treatment in Children

Given the lackluster effects of adult obesity treatment (Ayyad & Andersen, 2000), researchers have targeted children for treatment, with the hope that weight loss and maintenance occurring earlier in life will be more effective in the long-term. Although obesity treatment in adults is often ineffective, data suggest that weight loss targeting obese children has shown greater, albeit modest, promise (Fullerton et al., 2007; Garcia-Morales et al., 2006; Holterman et al., 2007). Similar to studies conducted with adults, treatment of obesity in children and adolescents results in small short-term decreases in relative weight or adiposity but has remained ineffective in the long-term. Most programs are characterized by substantial relapse to higher weight status one year after intervention (Epstein, Myers, Raynor, & Saelens, 1998). Despite initial weight losses with intervention, children tend to regain weight (Epstein, Roemmich, & Raynor, 2001). Even if children lose weight, many lose only a small percent of their overall body fat, and therefore they still remain overweight at the end of treatment (Epstein, et al., 2001).

The challenge of maintaining weight loss is not surprising given that important family factors play a significant role in children's weight. For example, parental weight and family lifestyles promote obesity in children. A child's family has been shown to be very influential on a child's eating habits, attitudes toward foods, and assessment of satiety (Patrick & Nicklas, 2005). Patrick and Nicklas (2005) found that family lifestyle preferences and cultural environment appear to have the greatest impact on the rising prevalence of childhood obesity and the limited success of obesity treatment in children.

4.2.1. Barriers to Treatment of Childhood Obesity

There are a number of barriers to effective weight loss treatment in youth. For example, data suggest that successful weight loss must involve increased exercise and decreased energy intake, yet changing both of these behaviors in children can be a challenge (Epstein, et al., 2002; Epstein, Paluch, Gordy, & Dorn, 2000; Goldfield et al., 2006; Rhee, De Lago, Arscott-Mills, Mehta, & Davis, 2005). While targeting reductions in sedentary behavior has been effective in treating and preventing pediatric obesity in the short-term, some research suggests that children revert back to overweight or obese status after the intensive treatment period is over (Epstein, Paluch, Kilanowski, & Raynor, 2004). It may be that intensive reinforcement by parents or caregivers may be necessary for children to maintain weight loss (Epstein, et al., 2004).

Weight loss and maintenance in youth poses a challenge because parents may struggle to reinforce diet and exercise in children. Many reasons for this challenge exist, for example, parents' own poor habits, lack of counseling to parents by health care providers on importance and methods of decreasing sedentary behavior in children, and parents' unwillingness or inability to acknowledge that their child is overweight (Etelson, Brand, Patrick, & Shirali, 2003; O'Brien, Holubkov, & Reis, 2004). An additional challenge to treatment of pediatric obesity is the fact that it requires time and effort, which is a challenge especially for families in which both parents work and therefore spend a limited amount of time with their children (Plourde, 2006). Rhee et al. (2005) found that pediatric weight loss treatment programs are most effective when parents accept responsibility for implementing changes into their child's eating and exercise habits.

Parents who do not view weight as a problem for their child are the least supportive of, and the least successful with, weight loss treatment efforts (Rhee, et al., 2005).

4.2.2. Parental Misperception of Childhood Obesity

Parental misperception of weight can interfere with identification and treatment of obesity in children. Patrick and Nicklas found that parental perception of child overweight and understanding of the health risks of obesity are barriers to pediatric obesity treatment (Patrick & Nicklas, 2005). Moreover, Rich et al. (2005) reported that mothers who do not identify overweight as a problem in their children feel that their child's overweight is a family trait or that their child will “grow out of” being overweight. Edmunds (2005) proposes that parents may not identify their children as overweight in order to avoid being blamed by health care providers for their child's weight. According to a study by Rich et al. (2005), 81% of mothers of overweight toddlers or preschoolers in the U.S. feel their child is healthy, and 50% of these mothers are not concerned about their child's weight. Other studies demonstrate similar trends in a lack of identification of overweight and obesity as well as underutilization of treatment guidelines for weight loss in such individuals (Barlow, 2007; Dorsey, Wells, Krumholz, & Concato, 2005; Hampl, Carroll, Simon, & Sharma, 2007; Huang et al., 2009; Riley, Bass, Rosenthal, & Merriman, 2005).

4.2.3. Lack of Identification of Childhood Obesity

It is not just parents who fail to identify overweight and obesity in children. Treatment of pediatric obesity is dependent on timely and accurate identification by health care providers; however, studies have found that physicians fail to identify or acknowledge obesity in up to 50% of obese children (O'Brien, et al., 2004). Benson et al. (2009) found that a large percentage of overweight and obese children remain unidentified by health care

providers, despite clear BMI definitions of overweight and obesity. Identification is the first step in treatment, and research indicates that early diagnosis has a greater likelihood of success in lifestyle modification (O'Brien, et al., 2004). According to Benson et al. (2009), only 10% of overweight children, 54% of obese children, and 76% of severely obese children in the U.S. have their conditions identified by a physician. Additionally, male children are less likely to be identified than female children, white children are less likely to be identified than black and Hispanic children, and younger children are less likely to be identified than older children (Benson, et al., 2009). Even in the children diagnosed as overweight or obese by their providers, evaluation and treatment are often not consistent with the Institute of Medicine recommendations (O'Brien, et al., 2004).

5. Obesity Prevention

Given that most obesity treatment is ineffective in the long-term for children and adults (Trasande, et al., 2009), and that obesity in childhood is the strongest predictor of obesity in adulthood (Plourde, 2006), it may be more effective to prevent than treat obesity (Inge et al., 2004; Mamun et al., 2009). Although obesity has reached an alarmingly high prevalence in the U.S., obesity in many cases can be prevented by modifying the behavioral risk factors for obesity before overweight and obesity develop in children (Taveras et al., 2009). According to Styne (2003), prevention is the most important approach to decreasing the prevalence of obesity in children and adults. There are a number of strategies that appear to be effective when implemented early in childhood, for example, teaching parents how to encourage healthy diet and exercise in young children (Brawarsky et al., 2005; Olson & Strawderman, 2003; Simon, Souza, & Souza, 2009; Taveras et al., 2009). Indeed, childhood has been viewed by researchers as an opportunity

to establish healthy eating and exercise behaviors that can protect children against future obesity (Barlow, 2007).

5.1. Obesity Prevention in Children

Parents influence the development of children's eating and activity habits early in childhood. They serve as role models and have a profound influence on children because the values and attitudes that are promoted in the home remain with the child throughout childhood and into adulthood (Neumark-Sztainer, Hannan, Story, Croll, & Perry, 2003). According to Birch (1998), differences in physiologic regulation of energy intake begin early in the child's life and are influenced by exposure to and repeated experiences with food. Early exposure to fruits, vegetables, and other healthy foods may lead to a preference for and consumption of these foods that persists into adulthood; however, over-controlling the child's diet may be counter-productive because it undermines the child's ability to self-regulate (Hill, 2002). Additionally, the context in which foods are offered can impact consumption of healthy food (Neumark-Sztainer, et al., 2003). When food is offered in positive contexts, the child is more likely to develop preferences for the food, and the child is more likely to develop dislikes for food offered in negative contexts. Neumark-Sztainer et al. (2003) found that regular family meals encourage consumption of a wider variety of healthy food as well as food that is lower in sugar and fat.

Active children are less likely to become overweight compared with inactive children (Lindsay, Sussner, Kim, & Gortmaker, 2006). Furthermore, active children are more likely to have parents who are supportive of the children's athletic, recreational, and physical activity interests as well as encourage children to incorporate an active lifestyle into daily routine (Lindsay, et al., 2006). Children of active parents are more likely to be

active compared to children of inactive parents (Lindsay, et al., 2006). Epstein et al. (2000) found that interventions aimed at preventing obesity need to shift activity choices by making it easier for youth to participate in activities and using positive reinforcement of reductions in sedentary behavior in youth. For example, proximal changes, such as removing the television from the child's room, has been shown to produce a shift towards physical activity (Lambiase, 2009).

5.2. Obesity Prevention in Infants

Obesity prevention may even have a role during infancy. Obesity may be prevented by targeting feeding behaviors during infancy, which influence weight gain and future BMI (Koletzko et al., 2009; Mesman et al., 2009; Ong, Preece, Emmett, Ahmed, & Dunger, 2002). Breastfeeding has been identified as an important factor that may prevent excess infant weight gain and subsequent obesity (Koletzko, et al., 2009). Numerous studies provide evidence that the longer infants are breastfed, the less likely they are to be overweight or obese later in life (Koletzko, et al., 2009; Miralles, Sanchez, Palou, & Pico, 2006; Ong, et al., 2002; Rooney & Schauburger, 2002). Greater duration of breastfeeding is associated with slower growth, resulting in lower weight at age 1 year (Baker, Michaelsen, Rasmussen, & Sorensen, 2004; Scholtens et al., 2007). Breastfeeding for greater than three months also is associated with a lower infant weight at age 14 months (Mesman, et al., 2009). Simon et al. (2009) reports that exclusively breastfeeding for more than 24 months actually serves as a protective factor against overweight in children. Furthermore, there is an inverse relationship between breastfeeding duration and risk for overweight and obesity later in life (Harder, Bergmann, Kallischnigg, & Plagemann, 2005; Owen, Martin, Whincup, Smith, & Cook, 2005).

The reason breastfeeding may be so crucial is that breast milk contains leptin. Leptin is a hormone that regulates food intake and energy metabolism and leptin in breast milk is an important factor that could explain the decreased risk of obesity of breastfed infants compared to formula-fed infants (Miralles, et al., 2006). Moderate levels of leptin in breast milk appear to provide moderate protection to infants from excess weight gain. Miralles et al. (2006) found that infant body weight during the first two years of life may be influenced by milk leptin concentration during the first stages of lactation. Differences in the prevalence of overweight have been demonstrated in studies comparing breastfeeding and formula feeding in infants. Formula-fed infants reached higher body weight at age 1 year compared with infants who were breastfed (Koletzko, et al., 2009). Ong and Loos (2006) found that infants who are exclusively formula fed and never breastfed have a higher prevalence of overweight (12.6% versus 9.2%) and obesity (4.5% versus 2.8%) when compared to infants who are breastfed.

In concert with this literature are data that formula-fed infants display higher energy intake as infants and children, which was associated with greater early gain in body weight and greater risk of obesity later in life (Gluckman et al., 2008). In another study, Sievers et al. (2002) found that infants who are formula-fed display a different sucking pattern, a lower frequency of meals, and longer time intervals between meals, compared to infants who are breastfed. Formula-fed infants display high pressure sucking at 2 and 4 weeks of age which results in a higher degree of adiposity at age 3 years (Sievers, et al., 2002).

Formula and breast milk also have been shown to have different protein levels (Koletzko et al., 2005). Most formulas have higher energy density compared with breast

milk. Indeed, one study found that formula-fed infants age 3-12 months display energy intakes that are 10-18% higher than those of breastfed infants (Daenzer, Ortmann, Klaus, & Metges, 2002). Excessively high protein intake may enhance the secretion of insulin and insulin-like growth factor I, which could enhance growth (Hoppe et al., 2004). In a study where infants were fed cow-milk protein-based infant formula, higher insulin levels were observed after feeding on day six of life compared to breastfed infants, which can enhance growth during the first two years of life (Hoppe, et al., 2004). Formula and breast milk have been found to differ in other nutrients as well, with formula having a stable nutrient composition, and breast milk being variable in nutrients, taste, and smell from day to day as well as from the beginning to the end of the feeding episode (Mennella, Jagnow, & Beauchamp, 2001). It is possible that exposure to a variety of flavors found in breast milk compared to formula may influence the child's later acceptance and consumption of a variety of food, which may contribute to healthier eating patterns and healthier weights (Mennella, et al., 2001).

Feeding practices may also differ between using formula and breast milk by quality of mother-infant interaction. Bottle-fed infants are more likely to be over-fed and be characterized by low parent responsiveness to child satiety cues, which is associated with higher BMI in infancy and childhood (Taveras, et al., 2009). Research suggests that breastfeeding enhances the emotional bonding between mother and child, and may decrease neuro-endocrine responses to stressors, decrease perceived stress levels, and decrease depressive symptoms compared to in women who do not breastfeed (Mezzacappa, 2004). Enhanced emotional bonding may improve the interaction between

mother and child regarding health-related behaviors, which may support healthy lifestyles and healthy weight.

5.3. Pediatric Obesity Prevention During Pregnancy

The difficulties of weight loss and maintenance in children and infants has led researchers to begin studying obesity prevention in the earliest stages in life (Inge et al., 2004; Mamun et al., 2009; Phelan & Wadden, 2002). As early as conception, mothers can have an impact on their child's future weight gain trajectory (Ozanne, Fernandez-Twinn, & Hales, 2004; Plagemann, 2004). Prevention of obesity in the earliest stage of life has shown to be the most effective because it is during *in utero* growth that the fetal metabolic system is created (Plagemann, 2004). Maternal weight status during pregnancy programs the metabolism in the fetus, which influences weight gain and subsequent development of disease risk factors (Ozanne, et al., 2004). Ong et al. (2002) found that there are unique windows of vulnerability to obesity that are established *in utero* and that influence hypothalamic-pituitary axis programming which increases future risk of obesity and diabetes, impairing weight loss and obesity prevention later in life.

Among the earliest predictors of excess weight gain in children are factors associated with the prenatal environment which affects birth weight of the fetus (Barker, 2007). Both excessive and insufficient maternal weight gain during pregnancy appear to be associated with excessive weight gain in the child during the first six months of life (Ong & Loos, 2006) as well as excessive weight gain in childhood (Asbee et al., 2009). Literature has consistently shown that birth weight is a critical determinant of growth during the first year of life for the child (Barker, 2004; Chen, Pennell, Klebanoff, Rogan, & Longnecker, 2006; Eriksson, 2005; Gillman et al., 2004; Mamun, et al., 2009; Mesman,

et al., 2009; Ong, et al., 2002; Oyama, Nakamura, Tsuchiya, & Yamamoto, 2009; Parsons, Power, & Manor, 2001; Taveras, et al., 2009; Whitaker, 2004). When an infant is underweight or overweight at birth, the infant is at increased risk for becoming overweight or obese later in life (Plagemann, 2004).

Excess maternal weight gain during pregnancy may result in greater adiposity in children through greater delivery of nutrients such as glucose, amino acids, and free fatty acids to the developing fetus *in utero* as well as postnatally to the developing infant through breast milk (Mamun et al., 2009). These data suggest that one potentially promising avenue for preventing pediatric obesity may involve promoting healthy weight gain in mothers during pregnancy. Appropriate gestational weight gain is important for achieving healthy pregnancies, deliveries, and birth weight outcomes (Olson, Strawderman, & Reed, 2004). Nearly one-third of pregnant women gain more weight than is recommended during pregnancy (Rhodes, Schoendorf, & Parker, 2003). Gaining too much weight during pregnancy is associated with having a heavier than average baby, increasing the risk for weight problems later in life (Leddy, Power, & Schulkin, 2008; Taveras, et al., 2009; Whitaker, 2004). Highly relevant are data indicating that even at birth, body weight tracks as infants grow (Mamun, et al., 2009; Mesman, et al., 2009; Parsons, et al., 2001; Whitaker, Wright, Pepe, Seidel, & Dietz, 1997). Indeed, heavier than average newborns have an increased risk of becoming overweight or obese children (Mesman et al., 2009). Thus, birth weight is a critical determinant of growth status throughout childhood (Mamun et al., 2009).

Gestational weight gain that is consistent with the Institute of Medicine recommendations is associated with improved maternal and infant health outcomes

(Brawarsky, et al., 2005) and is based on women's BMI prior to conception (Leddy, et al., 2008). These recommendations for prenatal weight gain are as follows: underweight women ($\text{BMI} < 18.5 \text{ kg/m}^2$) gain 28-40 pounds, normal weight women ($\text{BMI} 18.5\text{-}24.9 \text{ kg/m}^2$) gain 25-35 pounds, overweight women ($\text{BMI} 25\text{-}30 \text{ kg/m}^2$) gain 15-25 pounds, obese women ($\text{BMI} > 30 \text{ kg/m}^2$) gain 11-20 pounds, and morbidly obese women ($\text{BMI} > 40 \text{ kg/m}^2$) gain no weight. Asbee et al. (2009) found that women who adhere to the Institute of Medicine weight gain guidelines during pregnancy give birth to healthier weight infants compared to women who do not adhere to the guidelines. According to Olson et al. (2003), only 30-40% of U.S. women gain weight within these guidelines, while between 40-50% of U.S. women gain more weight than recommended (Oken et al., 2007).

5.3.1. Impact of Maternal Factors on Fetal Weight Gain

There are identified factors that appear to influence women's weight gain during pregnancy. Prenatal growth and birth weight are significantly impacted by genetics (Whitaker, et al., 1997) as well as maternal lifestyle behaviors including smoking (Ong et al., 2002), nutrition (Bergel & Barros, 2007; Huth, DiRienzo, & Miller, 2006), and exercise (Olson et al., 2003).

5.3.1.1. Maternal Genetics

Birth weight is influenced by genetic factors (Mesman, et al., 2009). Twin studies have demonstrated a genetic risk, where obesity has been observed in twin siblings independent of lifestyle factors such as diet and exercise in the siblings (Gale, Castracane, & Mantzoros, 2004). Parental obesity is a strong risk factor for the development of obesity in the child (Barlow, Bobra, Elliott, Brownson, & Haire-Joshu, 2007). Maternal and

paternal height and weight appear to influence the height and weight of the child (Mesman, et al., 2009). Whitaker et al. (1997) found that for both obese and non-obese children, the risk of obesity is greater if either the child's mother or father is obese. When both parents are obese, there is a 70% chance that the child will be obese; when one parent is obese, there is a 50% chance of the child being obese; and when neither parent is obese, there is only a 10% chance of the child being obese (Whitaker, et al., 1997). Whitaker (2004) found that children of obese mothers are twice as likely compared to children of non-obese mothers to have a large (greater than or equal to 90th percentile) birth weight for gestational age (12.4% versus 6.3%), and that children who are born to obese mothers are twice as likely to be obese by age 2 years, compared to children of non-obese mothers. Children with higher birth weight for gestational age are also more than twice as likely to be obese preschoolers, compared to children with normal birth weight (Whitaker, 2004). Whitaker (2004) found that by age 4 years, obesity is present in almost one in four of the children who are born to obese mothers, compared to less than one in ten of children who are born to healthy weight mothers.

5.3.1.2 Maternal Smoking

Smoking during pregnancy can impact the health of the mother and the developing fetus, and have lifelong adverse consequences on the health and weight of the child. Prenatal exposure to cigarette smoke increases the risk of spontaneous abortion, perinatal mortality, neonatal and infant morbidity (Higgins, 2002), as well as obesity in children (Chen, et al., 2006). Mothers who smoke during pregnancy gain less weight, which has been shown to interfere with fetal development (Rooney & Schauburger, 2002). Chen et al. (2006) reported a 100g decrease in birth weight for every 10 cigarettes smoked per day

by the mother during pregnancy. A consequence to low birth weight is the risk of excessive weight gain in early life. Ong et al. (2002) found that maternal smoking during pregnancy is associated with rapid weight gain in the infant's first 12 months of life—a risk factors for the development of obesity later in life. Whitaker (2004) reports that mothers who smoked during pregnancy are more likely than non-smokers to have low birth weight babies, but that these babies are more likely to be obese as preschoolers.

Consistent with these data, are findings indicating that maternal smoking during pregnancy also may be associated with poor appetite control in infants (Pardo, Geloneze, Tambascia, & Barros-Filho, 2004). Withdrawal from *in utero* smoking exposure may account for excess weight gain after birth, as is commonly reported during smoking cessation in adults (Pardo, et al., 2004). Excess weight gain may also be associated with the effect of cigarette smoke on leptin (Helland, Reseland, Saugstad, & Drevon, 2001; Toschke, Ehlin, von Kries, Ekbom, & Montgomery, 2003). Nicotine in cigarettes crosses the placenta and alters neurotransmitter levels in the fetus (Jauniaux & Burton, 2007), resulting in altered hypothalamic function and fetal growth retardation. Growth retardation has been shown to be a risk factor for obesity later in the life of the child (Sharma, Cogswell, & Li, 2008). Prenatal growth and birth weight are significantly impacted by maternal smoking during pregnancy. However, unlike genetics, smoking is a behavior that can be targeted by health care providers and modified by the mother during pregnancy.

5.3.1.3. Maternal Diet

Dietary choices made by mothers during pregnancy is important for maternal health as well as fetal development (Wu, Bazer, Cudd, Meininger, & Spencer, 2004). Consumption of substantially greater energy during pregnancy than prior to pregnancy is

associated with greater gestational weight gain, whereas consumption of less food during pregnancy than prior to pregnancy is associated with less gestational weight gain (Olson & Strawderman, 2003). Olson et al. (2003) also found that women who consume three or more servings of fruit and vegetables per day gain significantly less weight compared to those who consume fewer servings during pregnancy. Increased intake of specific macronutrients, such as folate and antioxidants, found in fruits and vegetables, is associated with healthier birth weights in the infant (Ramon et al., 2009). Ramon et al. (2009) found that vegetable consumption throughout pregnancy may have a beneficial effect on appropriate fetal growth. Higher intake of vegetables during pregnancy is associated with a decreased risk of having a small-for-gestational-age weight and length infant, reducing the risk for later development of excess weight in childhood. Lower vegetable consumption throughout pregnancy is associated with greater odds of a small-for-gestational-age weight and length infant (Ramon, et al., 2009), which increases the risk for the development of weight problems in the infant. The highest proportion of small length for gestational age was seen in the lowest quartile of vegetable consumption in pregnant women (Ramon, et al., 2009). A mother significantly impacts her child's prenatal growth and birth weight by dietary choices. Similar to smoking, dietary choices are behavior that can be targeted by health care providers during pregnancy and modified by the mother.

5.3.1.4. Maternal Exercise

Maternal exercise during pregnancy significantly impacts prenatal growth and birth weight. Decreased physical activity during pregnancy is associated with significantly greater gestational weight gain compared to maintaining or increasing physical activity

during pregnancy. Olson et al. (2003) found that women who are less physically active are 1.7 times more likely to gain more weight than recommended compared with those who maintain or increase their physical activity. Similar to smoking and dietary choices, exercise is another behavior that can be targeted by health care providers during pregnancy and modified by the mother.

5.3.1.5. Maternal Perception of Body Weight

A woman's misperception of her body weight may impact her dietary choices and physical activity behaviors and, in turn, lead to excessive or inadequate weight gain during pregnancy (Bennett & Wolin, 2006). Misperceived pre-pregnancy body weight status is directly associated with excessive gestational weight gain in normal weight, overweight, and obese women, with the greatest likelihood of excessive weight gain in overweight or obese under-assessors (overweight or obese women who identified themselves as average or underweight) (Herring et al., 2008). This study found that overweight or obese women who under-assessed their pre-pregnancy weight had a 7-fold increase in the odds of gaining excessive weight during pregnancy compared with normal weight women (Herring, et al., 2008). Furthermore, normal weight women who over-assessed pre-pregnancy weight had twice the odds of excessive weight gain during pregnancy (Herring, et al., 2008). Unlike behaviors such as smoking, dietary choices, and exercise, perception of body weight may be more difficult to modify by providers without mental health training. However, health care providers can play an important role in helping women to develop an accurate and healthy body perception during pregnancy. They should also be able to identify when a psychological referral is warranted.

6. External Factors Impacting Maternal Weight Gain During Pregnancy

6.1. Advice from Health Care Providers

Research has demonstrated that health care providers can influence the amount of weight a woman gains during pregnancy by targeting pregnant women's habits with regard to smoking, dietary choices, exercise, and perception of body weight. Asbee et al. (2009) found that women who receive organized and consistent dietary and lifestyle counseling avoided gaining excess weight during pregnancy compared with women who only receive routine prenatal care. Despite the role health care providers can play in assisting women with appropriate weight gain during pregnancy, Olson et al. (2004) reported that 59% of women receive no advice from their health care provider regarding how much weight to gain during pregnancy. Advice from health care providers is most effective when it includes the importance of both gaining a sufficient amount of weight as well as avoiding excessive gestational weight gain (Olson, et al., 2004). Women who gained insufficient weight and women who gain excessive weight were less likely to have spoken about weight gain with a health care provider at the beginning of pregnancy (Strychar et al., 2000). One of the reasons for unhealthy weight gain is the lack of continuity of care which interferes with comprehensive, long-term weight management. Women "fall through the cracks" of a fragmented health care system characterized by multiple providers who offer conflicting or inconsistent recommendations and who do not regularly follow up with the patient (Asbee, et al., 2009). These data suggest that continuity of care from one health care provider who takes an active role in advising the patient regularly throughout pregnancy on recommended weight gain guidelines as well as maternal lifestyle changes that may affect the health of the fetus may have an important impact on weight gain in the mother and child (Asbee, et al., 2009).

6.2. Continuity of Care for Mother and Fetus

The importance of achieving and maintaining a healthy weight during pregnancy is something that may not be understood by all women; therefore, following the consistent and comprehensive recommendations from one health care provider beginning prior to pregnancy and continuing throughout the child's development is an important aspect of achieving a healthy weight in both the mother and child (Asbee, et al., 2009). In order for a woman to maintain optimal health and weight during pregnancy, adhering to recommendations by the health care provider is important (Barlow, et al., 2007). For women who lack the skills and knowledge for healthy weight gain during pregnancy, the health care provider can be a vital link between information and the patients who can benefit from it (Power, Cogswell, & Schulkin, 2006).

Regular prenatal visits allow for the appropriate and timely identification of problems or potential problems that could adversely influence birth weight and overweight risk in the woman and her baby (Power, et al., 2006). For example, pregnancy-induced diabetes, also known as gestational diabetes (Leddy, et al., 2008), can be identified and monitored only if a woman is in regular contact with her health care provider. Compared to healthy women, a woman with gestational diabetes is more likely to give birth to a heavier infant (Leddy, et al., 2008). Data such as these point to the need for early diagnosis, treatment, and monitoring of gestational diabetes in the mother so that it does not adversely impact the child's weight and future health (Leddy, et al., 2008). Continuity of care appears to enhance the quality of the relationship between patient and provider and may provide opportunities for behavior modification training (Nawaz, Adams, & Katz,

2000). As continuous care from pregnancy through the postnatal period benefits the mother, it can also benefit the health of the infant growing into childhood.

6.3. Continuity of Care for Child

Health care providers are well positioned to provide continuous guidance for and monitoring of children's eating and activity behaviors beginning in the earliest stages of life (Barlow, et al., 2007). A provider who is familiar with the families' medical histories, cultural values, parental obesity status, as well as social and behavioral interactions, can provide comprehensive and dynamic care over time as the child develops (Rattay, Ramakrishnan, Atkinson, Gilson, & Drayton, 2009). Continuity of care allows for assimilation of information and preparation of personalized plans that may be crucial for the long-term compliance with health related goals, such as treatment or prevention of overweight or obesity (Plourde, 2006). Such an approach integrates patient self-management, family support, and provider monitoring to achieve continuous quality improvement in obesity treatment and prevention, whereby plans are modified over time based on how well goals are met (Margolis et al., 2004). Tracking BMI trends over time, providing motivation to overcome barriers to change, and fostering accountability are ways that health care providers can help prevent health problems, such as the development of obesity throughout a child's life (Barlow, et al., 2007). When the child returns to the same provider, the provider can revise the plan as needed, taking into consideration what techniques have been attempted previously and to what degree of success (Barlow, 2007).

To be effective in the long-term, healthy development and obesity prevention lie in the process of assisting the child's family to commit to behavioral changes when habits, culture, and environment promote more energy intake and less physical activity (Plourde,

2006). Knowing that birth weight is predictive of childhood weight, and that childhood weight is predictive of adult weight, providers should target maternal factors that impact birth weight as early as possible during pregnancy (Parsons, et al., 2001). Also, because children's needs and abilities change with age, the provider must be continually involved in the child's health in order to encourage age-appropriate target behaviors (Podraza & Roberts, 2008). The provider can offer ongoing support in the establishment and maintenance of the child's and the family's specific healthy lifestyle practices from before birth throughout infancy, childhood, and adolescence.

7. Conclusion

A substantial number of children in the U.S. are overweight or obese. Overweight during childhood puts individuals at higher risk for obesity in adulthood as well as higher risk for adverse physical and psychological health outcomes. Interventions intended to treat obesity in children and adults have been met with limited success. Given that in approximately three generations, it is predicted that half of all U.S. children will be overweight, prevention of obesity is a crucial step in reversing this trend. Health care providers who work with mothers pre- and post-natally are poised to play an important role in helping mothers gain healthy amounts of weight during pregnancy thereby potentially reducing the risk for overweight infants and children.

The goal of the present study is to determine the feasibility of an intervention aimed at preventing obesity in children by promoting healthy weight gain in women during pregnancy. When the mother gains excess weight or insufficient weight during pregnancy, the growing fetus is at increased risk for the development of obesity later in life. During the study, women will receive consistent recommendations, beginning early in pregnancy,

for how to achieve healthy weight gain during pregnancy (e.g., smoking cessation; diet and exercise to avoid gestational diabetes). Additionally, women will receive guidelines for how to encourage healthy weight gain after pregnancy in infants (e.g., breastfeeding; early, repeated exposure to healthy food). The mother will be educated on how to help her child maintain a healthy weight by modeling healthy behaviors herself and teaching her young child about the importance of an active lifestyle and healthful dietary choices.

Study Purpose and Rationale

To date, programs intended to reverse or slow the rising trend in overweight have been met with limited short-term success and virtually no long-term success. Of the many contributing factors to poor success rates, one important reason is the fragmentation of healthcare delivery in modern American medicine. Patients see multiple doctors for multiple reasons and often receive conflicting, inconsistent advice, or a frank lack of information. This lack of continuity disrupts care for chronic diseases, of which obesity tops the list.

The purpose of this study was to assess the feasibility of a program designed to prevent excess weight gain in infants through the provision of consistent counseling to women during their pregnancy and early in the baby's life. The delivery of healthcare at the University Family Health Center (UFHC) at USUHS is based on the family-centered model of care. The "One Family - One Doctor" model pairs a single doctor with each family thereby embodying the continuity of care approach. Physicians at the UFHC provide care for pregnant women, deliver their babies, and then provide follow-up well-child care for the infants. Similar to patients working with one physician throughout pregnancy and the postnatal period, in the present study, patients worked with one counselor throughout pregnancy and the postnatal period. Counselors educated participants on the importance of and methods for healthy weight gain in the women and their child. These relationships, based on continuity and longitudinal care, allow for the delivery of a new model of health education that may serve to prevent excess weight gain in young children. This study aimed to determine, from the patient perspective, whether or not the content of a novel counseling program is understandable, feasible, timely and

efficient. If, as anticipated, the program is acceptable to patients, a larger clinical trial will be conducted to formally assess the clinical effectiveness of the counseling program and the prevention of excess weight gain in children.

Specific Aims and Hypotheses

The present study had three specific aims, which are as follows:

Specific Aim One: To determine the feasibility and acceptability of a targeted family-centered counseling intervention delivered during routine prenatal and well-child visits to prevent pediatric obesity.

Hypothesis One: The counseling program will be feasible and acceptable to participants, in terms of content, understandability, timeliness, necessity, and effectiveness as measured by participants' responses to the Program Acceptability Questionnaire and mean number of sessions attended.

Specific Aim Two: To determine if the counseling program will contribute to a healthy weight gain in women.

Hypothesis Two: The counseling program will contribute to a healthy weight gain in women throughout pregnancy, as defined by the Institute of Medicine guidelines.

Participant self-efficacy will be measured by the Weight Efficacy Lifestyle Questionnaire.

Specific Aim Three: To determine if the counseling program will contribute to a healthy birth weight in infants.

Hypothesis Three: The counseling program will contribute to a healthy birth weight in infants defined by BMI percentiles for age and sex compared to the National Health and Nutrition Examination Survey (NHANES) published population data.

Power Analysis and Sample Size Estimation

The present study was a pilot feasibility trial. This pilot study was conducted to assist with establishing procedures, identifying factors that are most appropriate for a larger trial, and obtaining variance estimates needed in determining sample size for the formal trial. A pilot study with 20-30 degrees of freedom for error is generally quite adequate for obtaining reasonably reliable sample-size estimates (Lenth, 2006). Therefore, the study aimed to recruit up to 30 women to demonstrate program feasibility and show trends toward healthier weight trajectories, when compare with existing data from NHANES.

METHOD

Participants

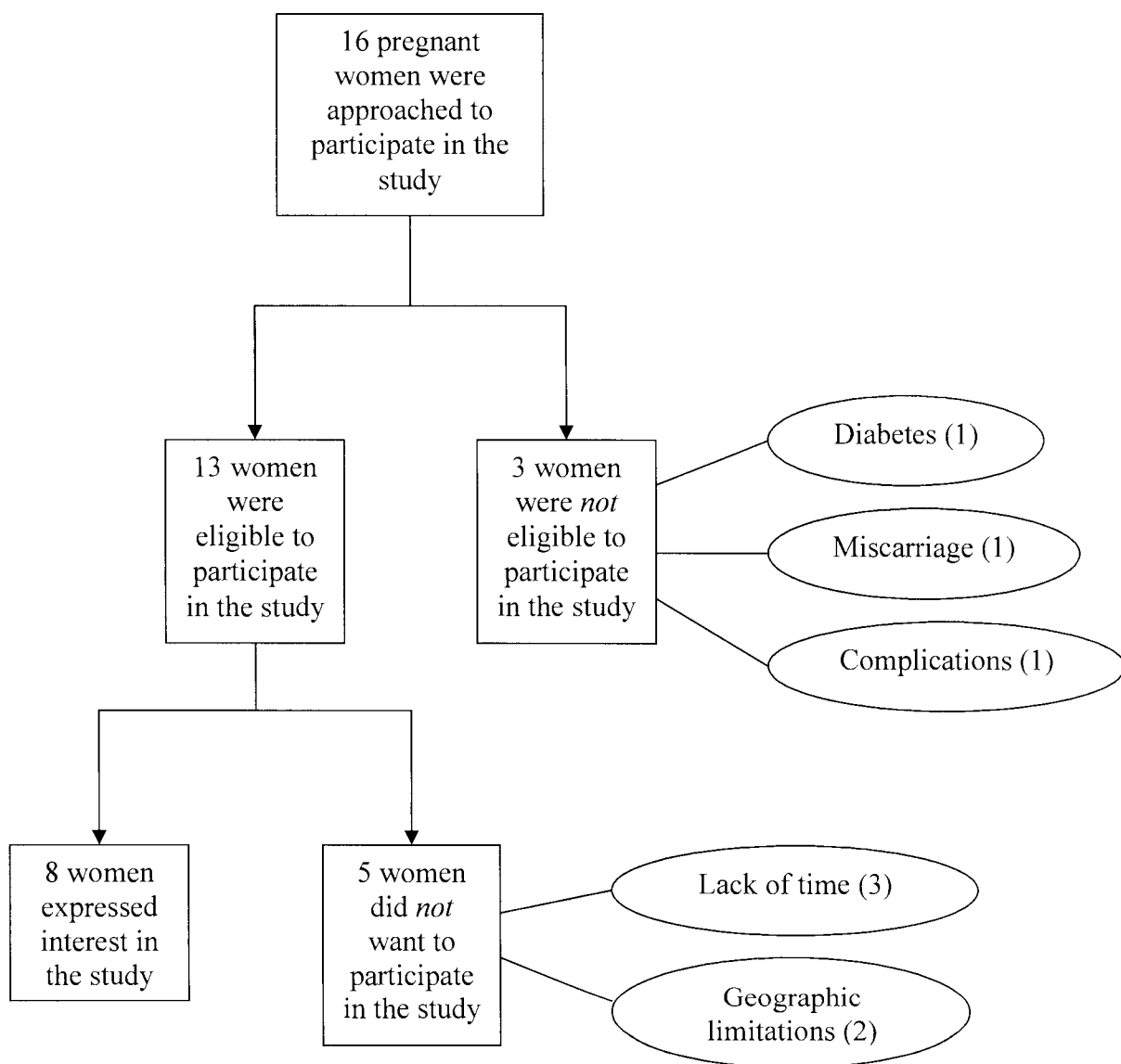
A convenience sample of eight women, age 18 to 35 years, who presented to the UFHC during their first trimester of their first pregnancy for prenatal care, were recruited for participation in the pilot program targeted toward promoting healthy weight trajectories in babies. Women of all ethnicities were considered for participation. Women were either active duty service members in one of the U.S. Armed Forces or a spouse of an active duty service member. Inclusion and exclusion criteria are summarized in Table 1 below.

Table 1. *Inclusion and Exclusion Criteria*

| <u>Inclusion Criteria:</u> |
|---|
| First time pregnancy |
| 18-35 years of age |
| Singleton pregnancy |
| Service member or military dependent |
| BMI 19-40 kg/m ² at beginning of pregnancy |

| <u>Exclusion Criteria:</u> |
|--|
| Major medical or psychiatric illness |
| Non-English Speaking |
| Planning to leaving area before child is 6 months of age |
| High-risk pregnancy |

According to UFHC, a pregnancy is considered high-risk if there are any factors that may increase the risk of pregnancy complication, such as if the mother is over age 35, is diabetic, has a history of miscarriages or a premature delivery in the past, has an infection or chronic condition, such as high blood pressure or compromised immune system, or if multiple fetuses or genetic complications are detected. Figure 1 illustrates the study participant flow.

Figure 1. *Study Participant Flow*

Recruitment

Upon verification of a positive pregnancy test at UFHC, women were asked by their physician, at their prenatal intake visit, if they were interested in participating in a pilot program targeted toward promoting healthy weight trajectories in babies. If interested, women were contacted by a program counselor within one week to schedule her consent procedure and arrange for the first counseling session at her next prenatal visit.

Consent Process

Program counselors obtained informed consent from eligible mothers. Consent forms are in Appendix 1. The consent visit and the intervention counseling sessions occurred in conjunction with routine prenatal care visits to reduce participant burden. Women were permitted to enroll or not enroll up until the first prenatal visit. Participants were told they may stop participating in the study at any time and were informed that if changes in the pregnancy occurred, placing them in the high-risk category, they would be withdrawn from the study and referred for appropriate care in accordance with standard clinic procedures.

Prevention Counseling Program Procedure

A licensed, credentialed family physician participated in the development of the clinical content of the counseling intervention (see Appendix 2 for Counselor Manual). A licensed clinical psychologist was responsible for the training of program counselors and supervision of their work with study participants. Participants received six, 20-minute individual counseling sessions within the primary care setting. See Appendix 3 for the Participant Packet (the handout summarizing the content of the six sessions). Sessions

occurred during the first, second, and third trimester of pregnancy, and again at the 2, 4, and 6-month well-child care visits and coincided with patients' regularly scheduled visits. If the participant was unable to attend the counseling session on the same day as the physician visit was scheduled, then the counselor scheduled a date and time that was consistent with the participant's availability. Other than what is described below, no additional medical data was collected outside of that normally documented as part of routine care processes. All patients received care within the standard Department of Defense 9-month prenatal protocol for low-risk births. Because the primary aim of this pilot study was to determine the feasibility of a longitudinal counseling program, participants' attendance was monitored and they completed a questionnaire designed to assess the acceptability and efficacy of the program.

Each participant met with the same UFHC provider and the same counselor throughout her involvement in the study. Counselors were graduate clinical psychology students enrolled at USUHS. In addition to receiving standard care from physicians, participants received counseling on dietary, activity, and healthy feeding practices during pregnancy and early in the child's life from program counselors. No monetary compensation was provided for study participation and the program was delivered at no additional cost to UFHC or the participant.

Prevention Counseling Program

The intervention was designed by the researchers to capitalize on the continuous, family-based model of care followed at UFHC. See Appendix 4 for the family-based model of care brochure distributed to participants by UFHC staff. The study consisted of six individual sessions designed to prevent excess weight gain in youth. Appendix 5

contains the content of the six sessions. Each counseling session focused on educating participants on the prevalence and risk of excess weight gain in children and provided them with steps to promote healthy weight trajectories during pregnancy and in early childhood. The themes of the interventions were as follows: obesity awareness, healthy pregnancy, healthy diet, exercise, breastfeeding, early infant feeding, and introducing solid foods.

Data Collection

This study involved collection of data at seven time points, all during participants' regularly scheduled prenatal and well-baby visits to UFHC, unless the participant preferred otherwise. See Table 2 below for the seven assessment time points. Participants were followed from the first trimester of pregnancy to the child's 6-month follow-up visit. This report discusses the results of the first half of the study from the first trimester to birth. A subsequent report will discuss the results from the second half of study from birth to the infants' 6-month well-child visit. The primary goal of the present study was to examine the acceptability and feasibility of the counseling program. Therefore, the following was assessed:

- (1) attendance, as measured by absolute number of sessions and percent of total sessions attended;
- (2) acceptability of the program, as measured by participant's responses to the Program Acceptability Questionnaire (PAQ).

To examine the secondary aim, the following data were collected:

- (1) Maternal anthropometrics: height and weight. At each prenatal visit, maternal height and weight was measured. Maternal height in centimeters was measured to the nearest

0.1 with the clinic balance beam scale height bar. Maternal weight in kilograms was measured to the nearest 0.1 with the clinic balance beam scale. Height and weight data were collected to follow the trajectory of maternal weight gain.

(2) Child anthropometrics: length and weight. Child length and weight at birth, two, four, and six months were collected to follow the trajectory of infant weight gain.

Table 2. *Data Collection Time Line*

Data collection at baseline and follow-up time points (shaded area to be discussed in subsequent report):

| Study Day/Period | Baseline | Session 1 | Session 2 | Session 3 | Birth | Session 4 | Session 5 | Session 6 |
|-----------------------------------|----------|-----------|-----------|-----------|-------|-----------|-----------|-----------|
| Assessment for Inclusion Criteria | √ | | | | | | | |
| Informed Consent/Assent | √ | | | | | | | |
| Mothers' Height/Weight | √ | √ | √ | √ | √ | √ | √ | √ |
| Children's Length/Weight | | | | | √ | √ | √ | √ |
| Questionnaires | √ | | | √ | | | | √ |
| Intervention | | √ | √ | √ | | √ | √ | √ |

Measures

Participants were asked to complete several questionnaires that examine psychological functioning and other factors that may relate to outcomes of the study

intervention. Questionnaires assessed whether individual variation with regard to psychological functioning, self-efficacy, and eating patterns impacted program feasibility and acceptability. All questionnaires were administered after informed consent was obtained.

The *Hopkins Symptom Checklist-90-Revised* (SCL-90-R) is a widely used measure designed for screening and assessment of psychopathology, symptom burden, and treatment effectiveness (Derogatis, 1977). Internal consistency, retest reliability, and validity of the questionnaire are good (Derogatis, 1977; Derogatis, 1992; Hardt and Brähler 2007). The 90-item self-report symptom inventory was designed to measure psychological symptom patterns in psychiatric and medical patients and has been validated in both populations (Derogatis, 1977). Each item in the inventory is rated on a five-point distress scale (0-4) ranging from “not at all” to “extremely.” The score reflects symptomatology in the following nine symptom dimensions: Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism. The SCL-90-R has been validated in samples of adult psychiatric outpatients, adult nonpatients, adult psychiatric inpatients, adolescent nonpatients (Derogatis, 1977; Derogatis, 1992). For non-patient adult females, a T-score range from 40 to 60 represents the normal range (Derogatis, 1992). In the present study, the SCL-90-R was administered at the baseline visit only. See Appendix 6 for a copy of the SCL-90-R.

The *Program Acceptability Questionnaire* (PAQ) is a brief, 6-item questionnaire used to assess the participant’s satisfaction with and the acceptability and feasibility of the intervention with respect to its intended function (Hunsley, 1992). Items are rated on a 7-

point Likert scale (1-7) ranging from 1 (not at all) to 7 (very), with higher scores indicating higher acceptability (e.g., How likely do you think it is that the counseling program may have negative side effects?). The PAQ measures how ethical, effective, and acceptable the program was, as well as how knowledgeable and trustworthy the counselor was. The PAQ is based on the Treatment Acceptability Questionnaire (Hunsley, 1992) with minor edits to indicate that the intervention is a counseling program as opposed to a treatment modality. The PAQ has demonstrated good internal consistency, test-retest reliability, and concurrent validity (Hunsley, 1992). In the present study, the PAQ was administered at Session 3 and Session 6. See Appendix 6 for a copy of the PAQ.

The *Weight Efficacy Life-Style Questionnaire* (WEL) consists of 20 items related to eating patterns and attitudes (Clark, Abrams, Niaura, Eaton, & Rossi, 1991). The WEL was designed to measure the following five factors related to self-efficacy judgments about eating behaviors: availability, negative emotions, social pressure, physical discomfort, and positive activities. Participants are asked to rate their confidence to successfully resist the desire to eat in 20 typical situations. There are four items per dimension of self-efficacy, which are scored using a 10-point Likert scale (0-9), with higher scores indicating greater confidence. The range of possible total scores for each dimension is 0-36. A total score of 0-180 is obtained by summing the score for each of the five dimensions of efficacy for weight management. Clark et al (1991) demonstrated that the WEL is an acceptable measure of an individual's self-efficacy judgments regarding his or her eating behaviors with good psychometric properties and sensitivity to change in treatment. The WEL can be used as a general screening instrument or to highlight strengths and weaknesses of the client's cognitive behavioral mechanisms in the regulation of eating. For the present study,

the WEL was used to represent the effectiveness of the intervention with respect to ability to maintain healthy eating habits that result in healthy weight gain during pregnancy. In the present study, the WEL was administered at baseline, Session 3, and Session 6. See Appendix 6 for a copy of the WEL.

RESULTS

Participant Characteristics

At baseline, eight participants enrolled in the study. At the first trimester, one participant discontinued the study due to geographic relocation. Another participant discontinued during her third trimester also due to geographical relocation. Six women are currently enrolled in the study. Three participants have reached the third trimester of pregnancy, and four participants have given birth.

The majority of the participants in the study were Caucasian ($n = 7$, 87.5%). One participant was Asian. The average age of the participants was 26.5, $SD = 3.25$ years. The majority of the participants were the spouse of an active duty service member enrolled as a medical student at USUHS ($n = 7$, 87.5%). One participant was an active duty service member enrolled as a graduate student at USUHS.

Baseline BMIs ranged from 19.4 to 25.5 kg/m². The average BMI of participants at baseline was 22.4, $SD = 1.8$. The majority of participants were of a healthy weight ($n = 7$, 87.5%) and one (12.5%) participant was overweight (BMI ≥ 25 kg/m²). No participant was underweight. See Table 3 for participant characteristics.

Table 3: *Participant Characteristics (N = 8)*

| <u>Characteristic</u> | <u>N</u> | <u>Percent</u> |
|--------------------------|-------------|----------------|
| <u>Race/Ethnicity</u> | | |
| Caucasian | 7 | 87.5 |
| Asian American | 1 | 12.5 |
| <u>Military Status</u> | | |
| Spouse of Service Member | 7 | 87.5 |
| Service Member | 1 | 12.5 |
| <u>Characteristic</u> | <u>Mean</u> | <u>SD</u> |
| Age | 26.5 | 3.25 |
| Baseline BMI | 22.4 | 1.8 |

Psychological Functioning

Responses on the Hopkins Symptom Checklist-90 (SCL-90) indicated that the sample was generally psychologically healthy. The mean SCL-90 Global Severity Index *T*-score for the sample was 54.8, *SD* = 11.1 (65th percentile relative to population norms; Derogatis, 1994). Thus, the sample has slightly, but significantly, greater psychological

distress compared to population norms ($t = 3.36$, $df = 8$, $p < 0.01$). The mean Positive Symptom Total T -score was 37, $SD = 8.0$ (13th percentile relative to population norms); therefore, the sample experienced significantly fewer self-reported positive symptoms compared to population norms ($t = 4.31$, $df = 8$, $p < 0.01$).

With regard to the individual subscales, the sample as a whole scored within the normal range in the following categories (all percentiles relative to population norms): Obsessive-Compulsive ($M = 53.4$, $SD = 10.6$; 64th percentile); Interpersonal Sensitivity ($M = 52.6$, $SD = 8.5$; 60th percentile); Hostility ($M = 50.9$, $SD = 10.8$; 55th percentile); Phobic Anxiety ($M = 49.4$, $SD = 8.1$; 45th percentile); Anxiety ($M = 46.9$, $SD = 10.0$; 40th percentile); and Paranoid Ideation ($M = 46.6$, $SD = 7.8$; 40th percentile). See Table 4 for mean SCL-90 scores at baseline.

Table 4: *Mean SCL-90 Scores at Baseline*

Mean, standard deviation, and range of participants' SCL-90 scores at baseline.

Participants were generally psychologically healthy. Although the sample had slightly, but significantly, greater psychological distress compared to population norms, the sample experienced significantly fewer self-reported positive symptoms compared to population norms.

| | <u>Mean</u> | <u>SD</u> | <u>Percentile</u> |
|---------------------------|-------------|-----------|-------------------|
| Somatization | 58.0 | 8.1 | 75 th |
| Depression | 56.1 | 7.8 | 73 rd |
| Obsessive-Compulsive | 53.4 | 10.6 | 64 th |
| Interpersonal Sensitivity | 52.6 | 8.5 | 60 th |
| Hostility | 50.9 | 10.8 | 55 th |
| Phobic Anxiety | 49.4 | 8.1 | 45 th |
| Anxiety | 46.9 | 10.1 | 40 th |
| Paranoid Ideation | 46.6 | 7.8 | 40 th |
| Psychoticism | 44.0 | 0 | 25 th |

The highest mean *T*-scores from the sample were in the categories of Somatization and Depression. The sample's mean Somatization *T*-score was 58, *SD* = 8.1 (75th percentile relative to population norms). The sample reported slightly, but significantly elevated levels of Somatization compared with population norms ($t = 4.62$, $df = 8$, $p < 0.01$). The sample's mean Depression *T*-score was 56.1, *SD* = 7.8 (73rd percentile relative to population norms). The sample reported slightly, but significantly, more symptoms of depression compared to population norms ($t = 4.18$, $df = 8$, $p < 0.01$).

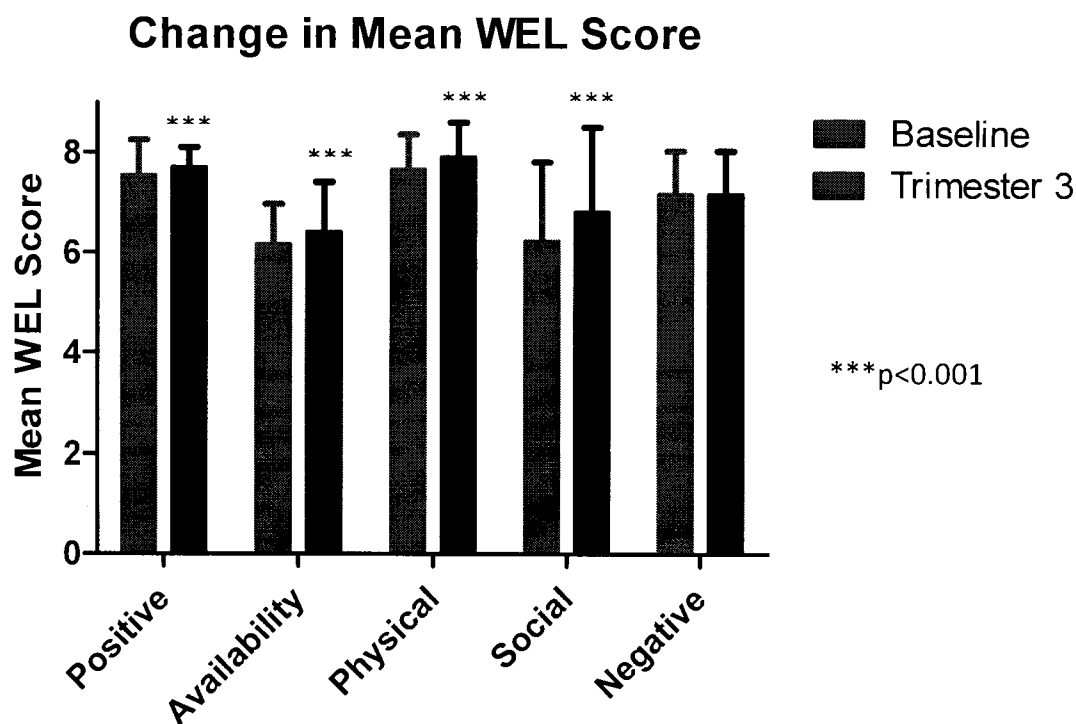
The sample reported significantly fewer obsessive-compulsive traits compared to population norms ($t = 3.24$, $df = 8$, $p < 0.05$), as well as significantly less interpersonal sensitivity compared to population norms ($t = 2.83$, $df = 8$, $p < 0.05$), and significantly less hostility compared to population norms ($t = 2.72$, $df = 8$, $p < 0.05$). However, the sample reported less, but not significantly so, Phobic Anxiety ($t = 1.93$, $df = 8$, $p = 0.09$), Anxiety ($t = 2.30$, $df = 8$, $p = 0.051$), and Paranoid Ideation ($t = 2.04$, $df = 8$, $p = 0.08$) compared to population norms. The sample scored the lowest (25th percentile relative to population norms) in Psychoticism ($M = 44$, $SD = 0$)¹. Thus, the sample reported fewer, yet non-significantly so, symptoms of Psychoticism compared to population norms ($t = 1.25$, $df = 8$, $p = 0.25$).

1. A standard deviation of zero was due to the fact that no participant endorsed Psychoticism. A mean *T*-score of 44 is the lowest possible score for the category of Psychoticism.

Self-Efficacy

The baseline WEL mean total score was 6.9, $SD = 0.6$. Participants reported higher levels of self-efficacy compared to the non-obese women in a study by Richman et al. (2001) which examined self-efficacy in eating behavior among obese vs. non-obese women. By the end of the third trimester, study participants' mean scores showed a non-significant trend toward increases in self-efficacy (7.2 ± 0.6 , $F(1,5) = 5.65$, $p = 0.06$). Significant improvements in self-efficacy were found for a number of the WEL subscales, indicating increased self-efficacy with regard to resisting overeating while experiencing the following situations: Food Availability (baseline: 6.2, $SD = 0.8$ vs. follow-up: 6.4, $SD = 1.0$; $t = 15.22$, $df = 5$, $p < 0.001$); Social Pressure (baseline: 6.2, $SD = 1.6$ vs. follow-up: 6.8, $SD = 1.7$; $t = 9.67$, $df = 5$, $p < 0.001$); Positive Activities (baseline: 7.5, $SD = 0.7$ vs. follow-up: 7.7, $SD = 0.4$; $t = 42.90$, $df = 5$, $p < 0.001$); and Physical Discomfort (baseline: 7.7, $SD = 0.7$ vs. follow-up 7.9, $SD = 0.7$; $t = 29.18$, $df = 5$, $p < 0.001$). In addition, participants reported an increase in the Bored score from baseline ($M = 5.75$, $SD = 1.7$) to third trimester ($M = 7.0$, $SD = 1.1$).² Thus, of all six WEL categories, participants experienced the largest improvement in the area of resisting eating when they were bored. By contrast, scores on the WEL Negative Emotion scale did not change from baseline to the third trimester (7.2, $SD = 0.09$ versus 7.2, $SD = 0.7$, $p = 0.43$). See Figure 4 for WEL scores from baseline to the third trimester.

2. The Bored subscale was created for this study. Therefore, there are no *t-test* results comparing population samples to the participants in this study.

Figure 2. *WEL Scores from Baseline to Third Trimester*

Attendance and Program Feasibility and Acceptability (PAQ)

Participants attended 100% of the counseling visits. The mean PAQ score was 6.5 (out of a possible 7.0), $SD = 0.5$. Mean scores for the following aspects of the PAQ: Trustworthy ($M = 6.9$, $SD = 0.4$), Ethical ($M = 6.9$, $SD = 0.4$), Acceptable ($M = 6.7$, $SD = 0.8$), Knowledgeable ($M = 6.6$, $SD = 0.8$), Recommend to a Friend ($M = 6.6$, $SD = 0.5$), Negative Side Effects ($M = 6.3$, $SD = 1.3$), and Effective ($M = 5.7$, $SD = 0.8$). See Table 5 for mean PAQ scores.

Table 5: *Mean PAQ Scores at Third Trimester*

The mean overall PAQ score was 6.5 out of a possible 7.0. Participants felt the program was acceptable, effective, and ethical, and that the counselor was trustworthy and knowledgeable. All participants would recommend the program to a friend.

| | <u>Mean</u> | <u>SD</u> |
|---------------|-------------|-----------|
| Acceptable | 6.7 | 0.8 |
| Trustworthy | 6.9 | 0.4 |
| Effective | 5.7 | 0.8 |
| Negative | 6.3 | 1.3 |
| Knowledgeable | 6.6 | 0.8 |
| Ethical | 6.9 | 0.4 |
| Recommend | 6.6 | 0.5 |

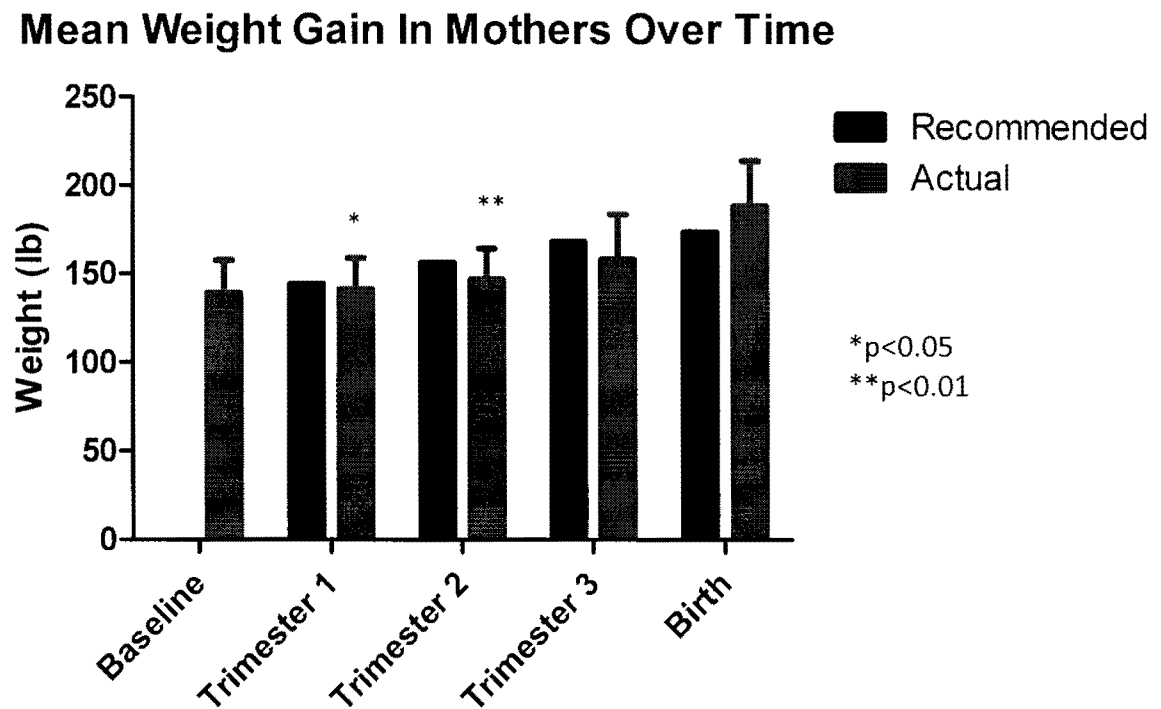
Secondary Analyses

Maternal Weight Gain

First trimester

The Institute of Medicine recommends that women who begin pregnancy at a normal weight should gain about four to six pounds during the first trimester, and then about 1 pound per week throughout the second and third trimesters. Women who begin pregnancy overweight should aim to gain about one pound every other week during the second and third trimesters (Brawarsky, et al., 2005). In the first trimester, the seven participants gained on average 2.0, $SD = 2.5$ pounds since baseline. This weight gain is consistent with a normal weight gain within a healthy population. Of the seven participants, 29.6% (2) gained less weight than recommended, 71.4% (5) achieved the recommended weight gain, and no participants gained more weight than recommended. See Figure 6 for mean weight gain in women compared to recommended weight gain from baseline to birth.

Figure 3. *Recommended and Mean Weight Gain in Women From Baseline to Birth*



Second Trimester

The Centers for Disease Control and Prevention recommend that women gain 6-12 pounds during the second trimester (Brawarsky, et al., 2005). Of the seven participants, 100% achieved the recommended weight gain. The seven participants gained on average 7.5, $SD = 3.2$ pounds since baseline.

Third trimester

The Centers for Disease Control and Prevention recommend that women who begin pregnancy at a normal weight should gain about 10-20 pounds in the third trimester, and women who begin pregnancy overweight should gain about 5-15 pounds in the third trimester (Brawarsky, et al., 2005). The seven participants gained on average 11.4, $SD = 9.6$ pounds since baseline. Of the seven participants, none gained less weight than recommended, 71.4% (5) achieved the recommended weight gain, and 28.6% (2) gained more weight than recommended.

Birth Weight of Infants

BMI measurements are not included because for infants under 2 years of age, BMI is not used by the Centers for Disease Control and Prevention. BMI-for-age is used to assess weight with respect to stature for children after the age of 2 years (Ogden et al., 2002). To date, four infants have been born. At birth, the four infants weighed an average of 8.0, $SD = 0.7$ pounds. One infant's weight was in the 25th percentile, two infants' weight was in the 50th percentile, and one infant's weight was in the 75th percentile. No infants' weight was found to be in the 90th or 95th percentile. See Table 5 for birth weight by percentile.

Table 6. *Birth Weight by Percentile*

| | <u>Number of Infants</u> |
|-----------------------------|--------------------------|
| 25 th Percentile | 1 |
| 50 th Percentile | 2 |
| 75 th Percentile | 1 |
| 90 th Percentile | 0 |
| 95 th Percentile | 0 |

Follow-up Verbal Feedback from Participants

Of the 6 participants, the following percentage endorsed (“yes”) and did not endorse (“no”) the following items: 100% of participants provided feedback on the pregnancy program; 83% ($n = 5$) asked questions about the program, while 17% ($n = 1$) did not; 83% ($n = 5$) of participants experienced a change in attitude toward pediatric obesity as a result of being in the program, while 17% ($n = 1$) did not; 67% ($n = 4$) learned something specific about pediatric obesity as a result of being in the program, while 33% ($n = 2$) did not; 67% ($n = 4$) planned to breastfeed during pregnancy, while 33% ($n = 2$) did not.

not; 50% ($n = 3$) made lifestyle changes as a result of being in the program, while 50% ($n = 3$) did not; 50% ($n = 3$) stated that the program helped them decide whether or not to breastfeed, 33% ($n = 2$) did not, and 16% ($n = 1$) did not respond; and 33% ($n = 2$) made suggestions for improving the program, while 67% ($n = 4$) did not. In summary, when asked independently during the study sessions, most participants stated that the counseling sessions they participated in improved their knowledge and skills regarding prevention of pediatric obesity.

Throughout the intervention program, several participants offered feedback on the program. According to one participant, the counseling program was “effective because it makes you think about these topics and it reminds you with appointments because being very busy, it’s easy to forget.” Another participant felt empowered when learning that she “can influence children in the womb even with dietary choices.” One other participant learned, as a result of the program, how to eat healthier during pregnancy by asking herself before eating a particular food if she would feed the food in question to her baby. This process reduces the amount of unhealthy food she eats because “eating the food is just like feeding it directly to my baby, and I wouldn’t do that!” According to another participant, the “variety of topics presented gave helpful and useful information.”

DISCUSSION

The purpose of this study was to determine the feasibility and acceptability of a targeted family-centered counseling intervention delivered during routine prenatal visits to prevent excess weight gain in participants during pregnancy and to encourage healthy birth weight in infants. It appears that the intervention was effective and well-received by

participants and that it contributed to healthy weight gain in women and healthy birth weight in infants. All three hypotheses examined in this study were supported. See Table 6.

Table 7. *Hypotheses Supported by Study Results*

| | |
|--|-----------|
| Hypothesis 1: The counseling intervention will be feasible and acceptable to participants | Supported |
| Hypothesis 2: The counseling intervention will contribute to a healthy weight gain throughout pregnancy in participants | Supported |
| Hypothesis 3: The counseling intervention will contribute to a healthy birth weight in infants | Supported |

First, it was hypothesized that the counseling intervention would be feasible and acceptable to participants, in terms of content, understandability, timeliness, necessity, and effectiveness as measured by the participants' responses to the Program Acceptability Questionnaire and the mean number of sessions attended by the participants. As predicted, the counseling intervention was feasible and acceptable to participants. This was evidenced by questionnaire responses and high attendance to the study counseling sessions. The mean overall PAQ score was a desirable 6.5 out of a possible 7.0. According

to the PAQ, participants felt the program was acceptable, effective, and ethical, and that the counselor was trustworthy and knowledgeable. All participants indicated that they would recommend the counseling program to a friend.

The second aim was to determine if the counseling intervention would contribute to a healthy weight gain in study participants according to the Institute of Medicine guidelines. It was hypothesized that the counseling intervention will contribute to a healthy weight gain throughout pregnancy in study participants according to the Institute of Medicine (IOM) guidelines. As predicted, the mean weight gained by the women was in the recommended range from birth to the third trimester. Questionnaire responses suggest that increased self-efficacy contributed to maintaining a healthy weight throughout pregnancy. During the intervention, women experienced increased self-efficacy with regard to resisting overeating when experiencing positive activities, high availability of food, physical discomfort, and social pressure to overeat. This will likely have positive implications for the weight of the infants, as healthy maternal weight gain during pregnancy has been correlated with healthy birth weight and future weight gain (Asbee et al., 2009).

The third aim was to determine if the counseling program would contribute to a healthy birth weight in infants. It was hypothesized that infants would be born within the healthy weight range recommended by the IOM. As predicted, the mean birth weight of the infants was in the recommended range according to the IOM guidelines. The findings from this pilot study lend preliminary evidence to support that the intervention may have important implications for the prevention of obesity. The next section will discuss the implications of the findings from this study.

Implications

The results from the pilot study suggest that the implementation of the counseling intervention may help to decrease the prevalence of obesity by preventing obesity from developing rather than treating it after it develops (Parsons, et al., 2001). Research suggests that it may be more effective to prevent rather than treat obesity (Inge et al., 2004; Mamun et al., 2009). The participants' healthy weight gain during pregnancy may increase the likelihood that their children will maintain a healthy weight throughout childhood and decrease the risk of becoming obese (Ong et al., 2002). The healthy birth weight of the infants further supports the increased likelihood that the infants will maintain a healthy weight throughout childhood. It has been shown that birth weight is a critical determinant of growth throughout the child's life (Barker, 2004; Chen, Pennell, Klebanoff, Rogan, & Longnecker, 2006; Eriksson, 2005; Gillman et al., 2004; Mamun, et al., 2009; Mesman, et al., 2009; Ong, et al., 2002; Oyama, Nakamura, Tsuchiya, & Yamamoto, 2009; Parsons, Power, & Manor, 2001; Taveras, et al., 2009; Whitaker, 2004) and that obesity in childhood is the strongest predictor of obesity in adulthood (Plourde, 2006). Given what is known about birth weight and childhood weight gain, the results of the pilot study are promising with respect to the prevention of obesity because the counseling intervention appears to help prevent high birth weight.

Additionally, the results from this pilot study support the literature indicating that continuity of care is an important factor in the prevention of excess weight gain during pregnancy (Asbee, et al., 2009; Barlow, et al., 2007; Plourde, 2006). Continuity of care is defined as a relationship between a patient and a provider which extends beyond a single

episode of care (Hennen, 1975). Patient satisfaction and health outcomes have been shown to improve with the existence of continuity of care (Gray, et al., 2003; Ridd, et al., 2006; Guthrie, et al., 2008). With respect to the pilot study, the study results suggest that women who receive organized and consistent dietary and lifestyle counseling during pregnancy may avoid gaining excess weight during pregnancy. Continuity of care in the form of consistent monitoring and recommendations may help to reinforce the knowledge and skills acquired by pregnant women as well as increase motivation for adherence to recommendations for healthy weight gain (Rattay et al., 2009). There are three dimensions of continuity of care: continuity of information, continuity in management, and continuity of the patient-provider relationship (Haggerty, et al., 2003; Saultz, et al., 2004). Of the three dimensions of continuity of care, the continuity of the relationship may be the strongest predictor of positive patient outcomes (Kearley, et al., 2001). Relationship continuity contributes to more effective communication, improved trust, improved patient satisfaction with outpatient services, improved preventive health care, increased use of appropriate preventive health services, greater medication adherence, and lower hospitalization rates compared to when there is no continuity of care (Mainous, et al., 2004; Mainous, et al., 2001). The data from the pilot study suggest that continuity of care received from one health care provider who takes an active role in advising the patient regularly throughout pregnancy on recommended weight gain guidelines as well as positive maternal lifestyle changes may have a positive impact on weight gain in the mother. This is likely because continuity of care appears to enhance the quality of the relationship between the patient and the provider and may provide increased accountability for favorable behavior modification (Nawaz, et al., 2000). With respect to the pilot study, it

appears that it may be the combination of the continuity of the relationship with the same physician and the same counselor as well as the continuity of the valuable information provided throughout the intervention which helps to make the counseling intervention feasible and acceptable to women. As continuity of care from pregnancy through the postnatal period benefits the mother, continuity of care may also benefit the infant growing from childhood into adulthood. By providing continuity of care, health care providers may play an important role in helping infants gain healthy amounts of weight throughout childhood which could potentially reduce the risk for obesity throughout the infants' development (Parsons, et al., 2001).

Limitations

There were two major limitations of the study. First, the participants of this study were military officers or spouses of military officers. The majority of military officers are college-educated and more likely to be highly motivated regarding health and fitness compared to non-officer military members and civilian counterparts (DoD, 2006). In 2004, 92.1% of military officers had earned at least a baccalaureate degree, with up to 45% earning an advanced degree, compared to only 7% of enlisted members (DoD, 2006). Among military enlisted members, 98.6% of enlisted military members had graduated from high school compared to 79.2% of civilian peers (DoD, 2006). In addition to study participants being military officers or spouses of military officers, several participants were spouses of military officers who were also medical students. It is possible that the participants began the study already educated on the impact of diet and maternal weight gain on the birth weight of the infant. The high socio-economic status of the participants

may limit the generalizability of the results of the study and does not offer any information on the feasibility or acceptability of the program for non-officer and non-military spouses.

The second limitation of the study is the small sample size. Due to the fact that this study was conducted as a pilot investigation, the main goal was to assess whether the program was feasible to any number of first-time pregnant women. Future studies will strive to recruit larger sample sizes in order to achieve an adequately-powered study, to test the internal and external validity of the counseling program, and to obtain statistically significant results. In addition to the limitation of the small sample size, there was no long-term follow-up of the participants to track the stability of the findings of the study. The primary researcher intends to follow up on the women's and infants' weight in a future study to explore the long-term effect of the counseling intervention on the weight of the infant.

Future Directions

As anticipated, the intervention program has been shown to be feasible and acceptable to first-time pregnant women. These results are promising for the next step in assessing the effectiveness of the program. There are several recommendations for the direction of future research. The next step should be to assess weight gain in infants throughout the first 6 months post-birth. The program targets several behaviors that have been shown to impact pediatric weight gain such as breastfeeding, overfeeding, and introduction of solid foods. Research should be conducted to assess if healthy feeding practices are associated with the prevention of excess weight gain as well as inadequate

weight gain in infants, as both excess and inadequate weight gain in infants have been shown to increase the risk of obesity later in life (Plagemann, 2004). Then, a larger clinical trial should be conducted to formally assess the clinical effectiveness of the counseling program with respect to the prevention of excess or inadequate weight gain in women as well as infants.

Additionally, in order to assess the generalizability of this approach, the program should be expanded to include women from diverse educational and occupational backgrounds as well as women receiving prenatal care at military bases other than NNMC as well as civilian sites. The current study participants indicated that they acquired new knowledge and skills for preventing pediatric obesity. It appears that the usefulness of basic information on diet and nutrition as it relates to pregnant women should not be underestimated. The intervention information was shown to be useful to military officers and spouses of military officers. Therefore, the information may be of equal or possibly increased usefulness to enlisted military members, spouses of enlisted military members, as well as civilians. Future studies could aim to make the intervention program available to a more demographically diverse population of women who may benefit from the knowledge and skills that the current participants have gained from the program.

After the effectiveness of the program has been assessed using a larger and more diverse sample size, future research should include an assessment of weight gain in women and children beyond 6 months post-birth. Assessing for sustainability of behaviors to prevent pediatric obesity past 6 months will be important for increasing the effectiveness of the program for infants as they grow into childhood, adolescence, and adulthood. Additional studies could expand recruitment to include women with high-risk pregnancies

such as women who have been diagnosed with gestational diabetes or other medical conditions such as hypertension. Broadening the sample with respect to health status may provide insight into how to improve the program to make it effective for a diverse range of women.

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APPENDICES

Appendix 1. Participant Consent Form

Appendix 2. Counselor Manual

Appendix 3. Participant Packet

Appendix 4. Family Centered Care Quick Reference

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APPENDIX 1.

PARTICIPANT CONSENT FORM

RESEARCH STUDY INFORMED CONSENT

Pilot study: Preventing pediatric overweight during pregnancy in a family care setting

INTRODUCTION

You are being asked to take part in a research study. Before you decide if you want to be in the study, you need to understand its risks and benefits so that you can make an informed decision. This is known as informed consent.

This consent form provides information about the research study which has been explained to you. Once you understand what it involves, you will be asked to tell the researcher if you want to take part in it. Your decision to take part in the study is entirely voluntary. This means that you are free to choose whether or not you want to be a research subject.

DESCRIPTION OF THE RESEARCH AND ITS PURPOSE

American children are becoming increasingly overweight. This places youth at high risk for poor health outcomes as adults. If the current trend in overweight and obesity continues, the present generation of American children will be the first in modern history to NOT outlive their parents. To date, programs intended to reverse or slow the rising trend in overweight have been met with limited short-term success and virtually no long-term success. Of the many contributing factors to poor success rates, we feel that one important reason is the fragmentation of healthcare delivery in modern American medicine, which means that patients see multiple doctors.

The purpose of this project is to see whether or not it is feasible to provide counseling to women during their pregnancy and early in their baby's life to specifically prevent the child from gaining too much weight as he/she grows. The delivery of healthcare at the University Health Center at USU is based on the family-centered model of care. Specifically, this model pairs one doctor with one family and emphasizes continuity. Physicians at the University Health Center provide care for pregnant women, deliver their babies and then provide follow-up well-child care for the infants. This allows time for relationships to form and trust to be established. We are specifically performing this study to determine, from your perspective as a patient, whether or not the content of our program is understandable, timely, efficient and 'do-able'.

PROCEDURES OF THE STUDY

This study will involve seven assessment points, all which will take place during your regularly scheduled visits to the USU clinic. Assessment points are the prenatal and well-baby visits in which the infant's and/or mother's height and weight will be collected and the mother will complete two questionnaires. The questionnaires will be completed at the visit and should take approximately 15 minutes to complete. Potential participants can decide to enroll in the study up until their first scheduled prenatal visit. Participants will be followed from the first trimester of pregnancy to the child's month 6 follow-up visit.

Visit #1 will take place during your initial prenatal appointment with your USU provider. We will go over this consent form in detail, review all parts of the study, and ask you to

sign the form. As part of your standard visit, your height and weight will be measured. We will also ask you to complete two questionnaires about your mood and eating patterns.

Visit #2 will take place during your first trimester prenatal appointment. As part of your standard visit, your height and weight will be measured. We will ask you to meet briefly (approximately 15 minutes) with a study team counselor.

Visit #3 will take place during your second trimester prenatal appointment. As part of your standard visit, your height and weight will be measured. We will ask you to meet briefly (approximately 15 minutes) with a study team counselor.

Visit #4 will take place during your third trimester prenatal appointment. As part of your standard visit, your height and weight will be measured. We will ask you to meet briefly (approximately 15 minutes) with a study team counselor. We will also ask you to complete two questionnaires about your mood and eating patterns.

Visit #5 will take place during your child's 2 month well-baby visit. We will measure your height and weight. We will ask you to meet briefly (approximately 15 minutes) with a study team counselor. We will review your baby's current height and weight and their birth weight at this visit as well.

Visit #6 will take place during your child's 4 month well-baby visit. We will measure your height and weight. We will ask you to meet briefly (approximately 15 minutes) with a study team counselor. We will review your baby's height and weight at this visit as well.

Visit #7 will take place during your child's 6 month well-baby visit. Your height and weight will be measured. We will ask you to meet briefly (approximately 15 minutes) with a study team counselor. We will also ask you to complete two questionnaires about your mood and eating patterns, and complete a brief discussion about your impressions of the program. We will review your baby's height and weight at this visit as well.

The principal investigators for this study are: Dr. Mark Stephens, from the Department of Family Medicine and Dr. Marian Tanofsky-Kraff, from the Department of Medical and Clinical Psychology.

STUDY PARTICIPATION CRITERIA

You are eligible to participate if this is your first pregnancy, you have no medical complications, are between the ages of 18 and 35, live in the Washington, DC area, speak English and have a body mass index (BMI; kg/m^2 ; to be measured at the USU health clinic) above 19 and less than 40, the standards for 'underweight' and 'excessively obese'. BMI is used to describe how much body fat you have compared to other individuals who are your age, gender and ethnicity.

If you have major medical or psychological illness, your pregnancy is considered high-risk, you do not speak English or you are planning to leave the area before your child's expected 6-month birth date, we will ask you not to participate in the study.

POSSIBLE BENEFITS

There are several potential benefits to you if you participate. You will meet with the same provider and counselor throughout your pregnancy. This continuity allows relationships to form and improves communication and trust. You will receive prenatal care in the standard way at the USU clinic. You will also receive counseling on dietary, activity and healthy feeding practices during your pregnancy and early during your child's life. This counseling is above and beyond routine counseling that would occur at regular visits. This offers you the potential benefit of an improved understanding of the role of lifestyle choices as they pertain to weight in pregnancy and early childhood. We cannot assure you that you will benefit directly from participation in this study.

COMPENSATION

There is no monetary compensation associated with this study.

POSSIBLE RISKS

There are no risks unique to this study. Your pregnancy will be managed by physicians at the University Health Center. If and when necessary, you will have access to the National Naval Medical Center Maternity Care service for any issues related to your pregnancy. This is the same care that all other patients at the USU University Health Center receive. It is possible that discussing weight may evoke feelings of anxiety, stress, or depression. If this occurs, participants will be able to discuss these feelings with their counselor to get the support they need.

RIGHT TO WITHDRAW FROM THE STUDY

You may decide to stop taking part in this study at any time. Additionally, if changes in the pregnancy occur placing you in the high-risk category, you will be withdrawn from the study and referred for appropriate care in accordance with standard clinic procedures.

PRIVACY AND CONFIDENTIALITY

All information you provide as part of this study will be confidential and will be protected to the fullest extent provided by law. The only information we plan to keep from this study are your opinions of our program and questionnaires. Your opinion of our question wording and other records related to this study will be accessible to those persons directly involved in conducting this study, members of the National Naval Medical Center Institutional Review Board (IRB), and members of the Uniformed Services University of the Health Sciences Institutional Review Board (IRB), which provides oversight for protection of human research volunteers. In addition, the Institutional Review Board at USUHS and other federal agencies who help protect people who are involved in research studies, may need to see the information you give us. Other than those groups, records from this study will be kept private to the fullest extent of the law. Scientific reports that come out of this study may include your ideas, but they will not use your name or identify you in any way.

RECOURSE IN THE EVENT OF INJURY

This study should not entail any physical or mental risk beyond those described above. We do not expect complications to occur, but if, for any reason, you feel that continuing this study would constitute a hardship for you, we will end your participation in the study.

In the event of a medical emergency while participating in this study or medical treatment required as a result of your participation in this study, you may receive emergency treatment in the University Health Center, the National Naval Medical Center or any other relevant Department of Defense healthcare facility. Care will be continued until the medical doctor treating you decides that you are out of immediate danger. In case you need additional care following discharge from the military hospital or clinic, a military health care professional will decide whether your need for care is directly related to being in the study. A participant may also seek emergency care at a civilian hospital, but this is not included in the study.

Completing the questionnaire may cause anxiety for some participants. If at any time you believe you have suffered an injury or illness as a result of participating in this research project, you should contact the Office of Research at the Uniformed Services University of the Health Sciences, Bethesda, Maryland 20814-4799 at (301) 295-3303. This office will review the matter with you, can provide information about your rights as a subject, and may be able to identify resources available to you. You may also contact the National Naval Medical Center Institutional Review Board Responsible Conduct of Research Service at (301) 295-2275.

IF YOU HAVE QUESTIONS OR CONCERNS

If you have questions about this research, you should contact Dr. Mark Stephens or Dr. Marian Tanofsky-Kraff, the persons in charge of the study. The phone number at USUHS is (301) 295-3632 for administrative questions related to the study or (301) 295-3630 for clinical questions related to the study. Even in the evening or on weekends, you can leave a message at that number.

FUNDING AND RESOURCES

This research proposal will be supported through the Uniformed Services University of the Health Sciences (USUHS).

By signing this form you are agreeing that this study has been explained to you, that you understood that explanation, and that you want to take part in this research.

Subject

Date of signature

Witness

Date of signature

I certify that the research study has been explained to the above individuals, by me or my research staff, and that the individual understands the nature and purpose, the possible risks and benefits associated with taking part in this research study. Any questions that have been raised have been answered.

Investigator

Date of signature

APPENDIX 2.
COUNSELOR MANUAL

Intervention 1: Trimester 1

Introduction

Session Objectives

1. Patient will understand program goal of 'starting early' as a means of preventing future child obesity
2. Patient will cite obesity as current health problem
3. Patient will learn a variety of factors during pregnancy and the first year of life that may impact their child's weight in the future
4. **Establish rapport with patient**

Introduction

- Start session by explaining who you are and the objectives of the program:
- **What we are doing is trying to target the earliest factors we know of to hopefully *prevent* children from becoming overweight as they grow up.**
- **The goal of the program is to see if early counseling during pregnancy can help prevent excess weight gain in children.**
- **Therefore, please know that the program is *not* intended to judge, evaluate, or criticize you for not doing a specific thing. We understand that many of the things we'll be talking about are hard to do. Our goal is to provide information and *work together to implement what you can.***

Topic 1: Obesity as health problem

1. Changing Health Issues
 - **Illustrate how health problems have changed. Give an example (i.e., half century ago worried about infectious disease, having enough food, versus today: allergies, obesity, etc.)**
 - **Put health issues in context of the mother's own childhood or her parents' childhood: When you were young, or, when your parents were young, clean your plate may have been a common theme at the dinner table, because parents were worried about kids growing and eating enough. Now, these problems are rare.**
2. Rising Prevalence
 - **Discuss *rising* prevalence of obesity**
3. Consequences of Obesity

- Discuss the **consequences of childhood obesity with patient, including consequences of obesity that emerge during childhood and adulthood, as well as the physical and emotional/psychological consequences of obesity. Emphasize that while many physical consequences are not present until adulthood, some psychological consequences during childhood can be equally harmful to a child (i.e., teasing, low self-esteem)**
- Give an example, (i.e., **a chubby baby, toddler, and sometimes even child, is cute, but a chubby child can also be teased, and this becomes increasingly relevant as children grow older (give another example i.e., during adolescence, overweight is the single most devastating ‘handicap’ for an adolescent female).**

Topic 2: Neonatal/Early life factors that impact obesity

1. Factors during (1) *pregnancy* and (2) *year 1* that can affect child's future weight
 - Emphasize **uniqueness of this program which targets fetal weight gain, neonates and infants (as opposed to children and adults who are already overweight)**
 - **Discuss factors *during pregnancy* that can affect child's weight and eating habits.** Use manual for interactive discussion. **Discuss factors in *first year of life* that can affect future weight outcomes.** Use manual for this as well.
2. How to start now (Weight gain, taste preference)
 - **Discuss specific weight gain recommendations and patterns based on pre-pregnancy weight (depending on whether mother is under, normal, or overweight, cite the amount of weight that she should gain).**
 - **Using patient handout, discuss ways of gaining a healthy amount of weight** (be non-forceful and non-judgmental during this part of the meeting; include something like “These are guidelines about what has been shown across a whole population of people. Each person is different, so just because you gain an amount of weight outside the recommendation doesn't mean your baby will be less healthy. Also, sometimes even though we do what we should do, our bodies still do what they want to do.”)
 - Emphasize that the number on the scale is only one piece of a larger puzzle. State that *not even considering the amount of weight that you gain*, there are many other ways to be healthy during pregnancy. Use this as a lead into discussing the concept of maternal diet on taste preference.
 - Introduce the concept of maternal diet affecting taste preference (this will likely be new and interesting to mothers). Encourage excitement about the fact that eating healthy foods can help her baby like healthy foods!
 - Lastly, say that you aren't going to go into detail about specific diet/exercise recommendations, but refer to the material that she will have to take home, and show where in the manual this information is provided. Tell her that if she has any questions about the diet or exercise recommendations, she can email or call you.

Take Home Message

- End on a positive note by asking the mother to brainstorm foods that she will try to incorporate into her diet in the context of taste preference.
- Tell mother that you will see her in 3 months to talk about healthy pregnancy in more detail and see how things are going.

Intervention 2: Trimester 2 Healthy Pregnancy

Session Objectives

1. Continue development of patient rapport and trust
2. Patient will understand factors *during pregnancy* that can impact her baby's weight in the future
3. Patient will feel positive about doing what she can to help prevent her baby from gaining excess weight in the future

Information Gathering

- Begin session by asking patient how her appetite has been up to this date of her pregnancy—move from general to specific (e.g. **How are you feeling? Morning Sickness? Cravings? How is your diet? Are you able to exercise? (Let them talk about the positive things they're doing longer than necessary).** Relate current positive behaviors to a recommendation that you will make during the session. **(For example, if she says she's exercising 3 times per week, say, "and you will see that later in today's meeting we'll talk about exercise but you are clearly already doing that, which is great.")** Ask about any particular problems.

Topic 1: Review of preventive model

- Refer to the manual showing points of intervention for overweight. **Explain that the same factors you talked about last time are equally influential and perhaps even more relevant now, since morning sickness is probably over and the patient may feel hungrier and experience more cravings. Focus on diet (along with exercise, stress) and having a healthy pregnancy for this session.**

Topic 2: Weight Gain

- Review weight gain recommendations and patient's current pattern and trajectory of weight gain. *This portion of the session should be directed by the mother; it is important to listen actively and use clinical judgment to guide discussion (or decide to conclude the discussion).* **Plot her starting weight at zero and point out whether her weight gain falls within the recommended value. If it does not, ask if she is concerned and if she is having difficulty with cravings/diet/exercise? If so, spend a few minutes discussing a particular goal. Conclude the discussion by explaining that 'at the end of the day sometime our bodies do what they want to do; you are doing X, Y, Z, right.'** Then move on to discussion of diet dichotomous from weight gain.

Topic 3: Diet

- Diet: Use manual to discuss and review diet recommendations during pregnancy. **Briefly review the list and ask if there are any particular recommendations that she would be worried that she is having difficulty with?**
- Taste Preference: Re-visit the concept of taste preference. **Inquire whether she is a fruit/vegetable eater? Is she an exotic eater? (likes trying new foods and interesting flavors) Relate this to how it may help her baby to be readily receptive to fruit/vegetable flavors**

Topic 4: Exercise

- Similarly, review list of recommendations in parent manual

Topic 5: Stress management

- Similarly, review list of recommendations in parent manual

Take Home Message

- Ask the mother to review how important appropriate prenatal weight gain is to her, and how confident she is that she will meet those goals.
- Review concept of taste preferences, routine diet recommendations and routine exercise recommendations for healthy pregnant mothers.

Intervention 3: Trimester 3

Preparing for birth

Session Objectives

1. Patient will cite positive behaviors that are helping her baby.
2. Patient will understand benefits of breast feeding.
3. Patient will be motivated to try to breast feeding (many already will be).

Information Gathering

- Start session by **assessing how patient is doing with regard to: feeling, weight gain, diet/appetite, exercise, stress. If any one of these is not going well, say that you will come back to it later in the session.** This will allow all key aspects to be tied together when reviewing appropriate changes, *and* it will allow you to use areas that are going well to provide encouragement and positive feedback.
- Feedback: After assessment: commend positive behaviors, address difficult issues, (if *weight gain* is the difficulty, review eating behavior as opposed to actual dietary intake (ie. Responding to cravings), as it relates to weight gain. Strategize with patient about how to incorporate positive change.
-

Topic 1: Breast versus bottle feeding

1. Introduce by asking mother whether she plans to breastfeed?
2. Advantages of Breast feeding
 - Discuss advantages of breast feeding non-judgmentally. Acknowledge that many women have probably heard, and could probably list, the praises of breast feeding by saying something like **“You may have heard this many times but I’d still like to review some of the advantages of breastfeeding...”** Explain that you want to talk about this primarily in the context of how it can help prevent excess weight gain.
 - **Using the manual as a guide, briefly review the protective effects of breastfeeding.** (Most women have likely heard this before).
3. Protective effect of breastfeeding against overweight
 - Energy intake in infants and toddlers. **Show energy intake in infants and toddlers chart; explain that babies who breastfeed are less likely to exceed their energy requirement.** This implies a protective effect of breastfeeding against overweight. Talk about the theory that **breast feeding may promote intuitive eating** in the baby (i.e., The baby will learn to eat when hungry and stop when full, as opposed to

'cleaning it's plate,' or 'finishing the bottle'). Show the graph "Infants adjust their calories."

Topic 2: Breastfeeding difficulties

1. **Indicate that you know that breastfeeding can be difficult. Nevertheless, unless she is completely opposed to it, breastfeeding is worth a try!**
2. Prepare for barriers to breast feeding
 - **Briefly acknowledge difficult aspects of breast feeding (sleep, milk won't come, nipple pain, engorgement, breast infection), and relate that we can help overcome these challenges.**

Take Home Message

- Conclude the session by acknowledging that breastfeeding can be difficult but has many benefits!
- Tell patient you will see her 2 months after her baby is born!

Intervention 4: 2 Month Well-Child Visit Infant and Newborn Feeding

Session Objectives

1. Mother will continue breastfeeding, or
2. Mother will implement healthy bottle feeding strategies.
3. Mother will understand appropriate “physical activity” for young infant.
4. Mother will understand variation in cries and learn how to differentially respond to infant’s crying.

Information Gathering

- This will be the first time you meet with the patient after the baby is born, so **allow several minutes to talk about the birth experience. Lead into a discussion about feeding practices (this will almost solely be whether or not the mother is breast feeding. Ask how breast (or bottle) feeding is going? Identify problems, concerns and acknowledge barriers and frustrations.**
- Feedback: If the mother is breastfeeding, and it is going well, **re-emphasize all the advantages, and provide positive breastfeeding support.**
- If the mother is trying to breastfeed, but encountering difficulties: 1. commend her for trying!! 2. Inquire about specific difficulties** 3. Strategize about solutions and offer lactation consultation.
**use clinical judgment to assess whether she has/will bottle feed, and, if so, discuss healthy strategies for bottle feeding.
- If patient is solely or primarily bottle feeding, discuss healthy bottle feeding practices. Specifically review timing, frequency, volume and circumstances of bottle feeding. Provide general guidelines for total caloric requirements in bottle-fed infants.

Topic 1: Nutritional Intake for Infants

From the industry-sponsored Feeding Infants and Toddlers Study (FITS) study, we know that (1) infants diets vary significantly from day to day. (Thus, there is no need to worry if an infant eats less on some days than others). They are very good at “subconsciously counting calories” (2) Nutrition is generally good throughout the first 2 years, but (3) Energy intake tends to exceed expenditure by an increasing amount as toddlers grow older.

- Use intake exceeding estimated energy requirement chart to explain that from birth through 24 months, the child assumes the eating habits of the family.

- If the mother is breastfeeding or partially breastfeeding (or on the fence), show and explain the chart that relates breast vs. bottle feeding to estimated energy requirement.

Topic 2: Feeding

- It is recommended that babies exclusively breastfeed for the first 4-6 months and up to 1 year if possible.
- The quantity of formula a baby needs depends on the child's weight, growth rate, and metabolism. Most newborns will drink two to three fluid ounces per day for every pound of body weight. For example a 10-pound baby, will drink between 20 and 30 ounces of formula each day.
- Most babies will consume ~4-5 oz 4-6 times per day. However, emphasize that it is unnecessary to persevere on exact amounts, because infants are very good at regulating intake.
- Until 4 months of age, no cereals, juices, or additives to bottle, are needed.
- Being eager to have the baby finish the bottle encourages overeating.
- Cues that an infant is full include: turning head away from nipple, releasing nipple, or falling asleep

Topic 3: Responding to fussiness

- Ask mother if her baby is fussy. Ask her to identify some of the reasons that her infant cries. Ask if she can tell the difference between different cries. If yes, commend her ability to know what her infant needs. Ask how she settles her infant when he/she is fussy?
- Lead the discussion toward the idea that not all crying means hunger.
- It is easy to settle a fussy baby with food. Food may soothe/calm the infant even when he/she is not hungry. This not only promotes the infant to 'overeat,' and ignore its internal hunger signals, but it also builds the connection between food and comfort/soothing.
- Ask mother to think of some other ways of soothing her baby. These include but are not limited to: rocking, rubbing, light massaging, cuddling, and listening to music.

Topic 4: Activity for infants

- Acknowledge that it may sound silly to talk about 'physical activity' for a two month old child. However, it is important to develop early strategies that encourage infants to be active! Provide basic suggestions and refer to their location in parent manual: crib mobiles, encourage reaching, kicking stretching, and supervised belly play, minimize TV and stationary playthings.

Take Home Message

- Summarize that eating habits develop early. Emphasize that she knows/has learned some strategies to help her infant build healthy eating habits.
- Tell patient that you will see her when her infant is 4 months old (in 2 months) to talk about introducing solid foods.

Intervention 5: 4 Month Well-Child Visit Introducing Solid foods

Session Objectives

1. Mother will learn appropriate timing of introduction of various solid foods
2. Review presentation of different foods types in the context of 'acceptability'.
3. Mother will understand appropriate 'activity' for 4-month old.

Information Gathering

- Start by inquiring about infant feeding. **How is breast (or bottle) feeding going? Does he/she eat well? Particular problems? Has your infant tried any solid foods? What foods? Does he/she like them? What does he/she like?**
- Feedback (same as previous, encourage continuation of breastfeeding and/or healthy bottle-feeding, address concerns with regard to feeding. Use discussion of infant's feeding as an introduction to talking about recommendations for introducing solid foods.

Topic 1: Introducing solids

1. Timing of foods

- **Explain that 4 months of age is a time when most infants are ready for soft 'solid' foods such as baby cereal.**

Review specific information on the timing of when to introduce particular foods (in parent manual).

2. Repeated exposure to foods

- **Explain that babies have a natural taste preference for sweet and salty foods, and a biological distaste for bitter and sour foods. Infants often tend to resist new foods.**
- **Because of this, it can take multiple tries to determine if an infant 'likes' a new. Because children like and eat what is familiar, it is important to present new foods on multiple occasions even if an infant appears to dislike it.**
- **The extrusion reflex (infant protruding his/her lip and spitting out food), is normal and does not mean that a baby doesn't like the food.**

3. Breast milk consumption will naturally decrease as solid food intake increases.

- Introduce concept of complimentary feeding. Ask mother if she has heard of complimentary feeding. Explain that complimentary feeding is overlapping

breast/bottle feeding with introduction of solid foods, rather than a single immediate transition. Expect daily milk intake to fall as baby's food intake increases.

4. Establishing good habits

- Interactively list foods patients would imagine encouraging an older child to eat. Direct the patient toward listing foods they want their infant to eat. Discuss what is meant by "natural foods," "added sugars," "saturated fats," and "highly processed foods."
Discuss how to evaluate baby foods and read nutrition labels. Bring examples of baby food containers to illustrate how to evaluate baby food labels.
- Avoid introducing highly palatable foods with added sugars, such as 'combo dinners' and baby desserts. Infants don't need dessert!
- Discuss the impact of juice. Acknowledge that they have probably heard on the TV or read research on juice impacting weight gain, in childhood. In infants also, excessive juice is a risk for obesity. Recommendations for juice drinking in infants include: giving only 100% juice, waiting until 6 months of age to introduce juice, drinking juice only from a cup, not from a bottle, and limiting amount of juice to 3 oz. initially to a maximum of 4-6 oz. per day for 1-6 year olds. If the baby does not like juice, this will be less of an issue during childhood.
- Focus on new eating experiences and skills. For the infant, the texture, smell and 'feel' of food are often as important as the taste.

Topic 2: Modeling

- Parent's eating habits influence baby's choices, even at this age. Ask mother what kind of an eater she is? Would she want her child to eat like her? If she says yes, emphasize the importance of demonstrating her positive eating behaviors in front of her child. Specifically, enjoyment of a variety of healthy, natural foods.
- If no, redirect the conversation toward how she can model healthy eating behaviors in front of her child.

Topic 3: Activity

- Discuss the concept of energy expenditure, energy intake and overall caloric balance (weight gain). Ask what mother typically thinks of as energy expenditure (many will cite intentional exercise).
- Explain that many people think of exercise solely as 'going to the gym'. Explain that another type of activity: lifestyle exercise is equally, if not more important, in terms of excess weight gain. Activities such as walking, playing with the infant, using stairs (instead of elevators); not only promote wellness in the mother, but also help to model healthy activity behaviors for the young child.
- Define inactivity as it applies to adults and then how this same concept applies to infant.

- Ask mother about what parenting strategies she might imagine would be conducive to encouraging activity and reducing inactivity in her growing infant. Encourage mother's own ideas, and also mention belly play time, sitting with support, encouraging reaching and holding objects, play gyms, and not using the TV as a babysitter, (minimize TV)).

Take Home Message

1. Reinforce positive eating behaviors and encourage activity in her infant. Discuss limiting TV/video and the importance of modeling healthy eating and activity behaviors.
2. You will see her in 2 months to talk more about eating behavior.

Intervention 6: 6 Month Well-Child Visit

Food Meaning

Session Objectives

1. Mother will understand that food has various meanings and be able to give examples of food meanings.
2. Mother **can evaluate her child's feeding practices/eating behaviors** as they relate to weight gain and food meanings.
3. Mother is confident in her ability to institute healthy feeding practices and promote healthy eating behaviors in her child.

Information Gathering

- How is her child doing overall? (growing? eating?) How is your child as an eater (fussy, good eater, seemingly overeating, advance (trying lots of solid foods), How much are you breast/bottle feeding? What foods have you introduced? How has that been? What foods does your child like?
- Is your child fussy? What do you do to stay relaxed? What do you do for your own time?

Topic 1: Food Associations

1. Food and emotions

- Introduce concept of multiple food meanings by asking mother to imagine all the reasons she might eat. Make a list of these and evaluate each in terms of whether it could be a healthy practice in terms of physical and emotional well being. Ask mother to imagine a time when she was a child if she remembers eating to feel better, eating/food as reward, etc. (i.e., no dinner if you were bad, going out for ice cream for good grades; 'there are starving kids in China').
- Many early childhood memories surround food (i.e., Christmas dinners, picnics, family events). There are often strong positive connections between good emotions and eating, and how these start early.
- Link to how parenting practices and childhood feeding/eating behaviors enable/discourage unhealthy food associations. (i.e., giving one food as a reward for finishing a vegetable, using a bottle or TV to sooth the child). Guide patient in making a list of strategies to optimize healthy food associations for the child (what to do, what to avoid).

2. Parent and Child Roles

- Parents and children play different roles with regard to a child's eating behaviors. The parent's job is to offer the child a healthy variety of foods and a supportive eating environment. The child's job is to decide when and how much to eat.
- During meals, the parents should act as role models. Re-emphasize that very young children do not need dessert. This is unnecessary, and avoiding this habit early can help children also avoid excess weight gain. Emphasize that families should eat together at the table. This is a behavior that should continue through the child's school years. Also, turn off the TV during meals. Preferably, have the TV in a location that is entirely separate from the dining area.
- Discuss concept of restricting "bad" foods. Ask the mother whether her own parents implemented food restrictions. Lead the discussion toward the idea that restriction and putting foods "off limits" in fact encourages their consumption, and increases a child's desire for these foods. Also note that foods do not need to be labeled as "good" or "bad."

Healthy Eating practices for Babies (General Guidelines)

- Emphasize eating skills and experiences. 'Eating' involves all 5 senses for infants—touch, smell, taste, sight and sound.
- As your child gets older, establish a typical eating schedule that includes meals and snacks. Children should not snack in front of the television, in the car or simply out of boredom.
- Emphasize fruits and vegetables, offering them at every meal.
- Introduce a variety of meats as your infant grows older.
- Variety—offer many new foods and textures, and familiar foods prepared in new ways. Offer finger and table foods; offer real, regular adult foods (diced or pureed), as opposed to kid versions.
- Discuss 'food safety'. Some foods are a choking hazard (hot dogs are a good example). Parents should ensure that foods they give their infant is presented in a style and quantity that will not present an airway hazard!

Topic 3: Activity

- The goal is to promote activity and reduce sedentary activity
- Brainstorm with mother ways of encouraging activity. Get her input to minimize TV and stationary devices, letting child sit up without support and encourage crawling around, minimizing TV until age 2.
- Discuss prevalence of TV in American homes.

- Point out the relationships between TV, video games, home computers and obesity. Time spent in front of a monitor is sedentary time.

Take Home Message

- Commend mother on already being way ahead because she has already started helping her child establish healthy eating and activity habits when her child is just an infant!
- Emphasize that as her child grows older, the roles of the parent/child remain the same. Emphasize the importance of positive food experiences and modeling healthy behaviors.
- Conclude by reiterating how prepared she is to raise a healthy child, that this program is over but that you are available to contact if she has any questions along the way.

At the conclusion of this final session, a brief discussion will be held with each participant to review their overall impressions of the program in an open-ended fashion.

APPENDIX 3.
PARTICIPANT PACKET

Changing Health Issues



Health problems for kids have changed throughout the past several decades:

In the past, health problems tended to be related to not having *enough* food:

- Under-nutrition
- Vitamin Deficiencies
- Infectious Disease

Counter-intuitively, in a new age of over-abundance, many healthy problems are related to having *too much* food:

- Over-nutrition
- Obesity and related problems
- Auto-immune

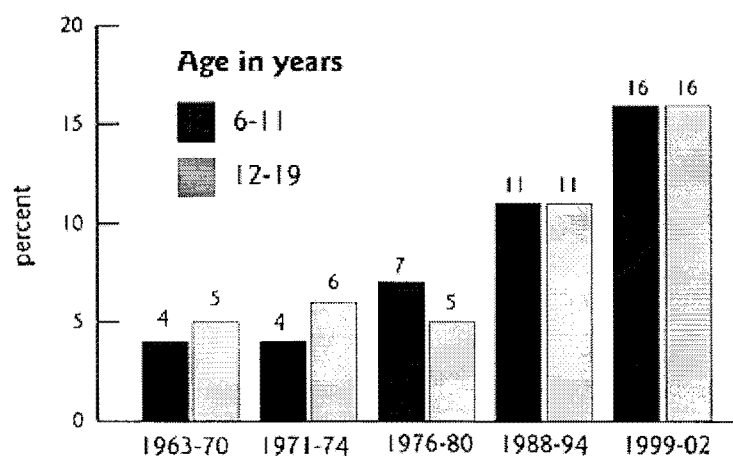
Obesity and related conditions are important targets for raising healthy kids: BEING OVERWEIGHT IS MUCH EASIER TO PREVENT THAN TO CURE!

It is much easier to never gain too much weight, than to gain it and then have to lose it.

Prevalence of Obesity

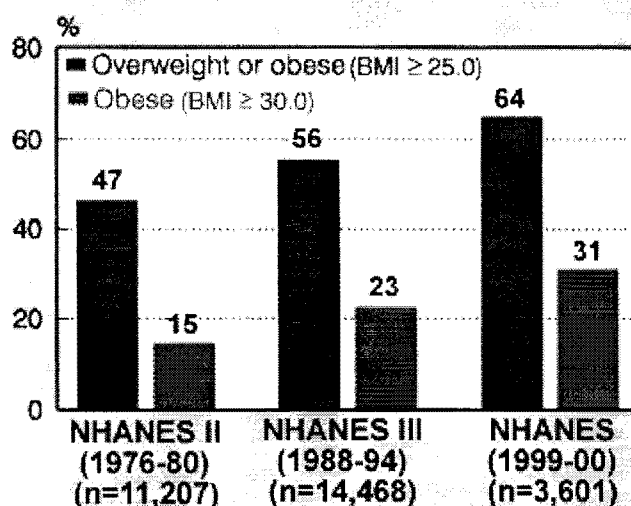
Obesity among children, teenagers, and adults has nearly tripled throughout the past three decades.

Prevalence of overweight among children and adolescents ages 6-19 years



Notes: Excludes pregnant women starting with 1971-74. Pregnancy status not available for 1963-65 and 1966-70. Data for 1963-65 are for children 6-11 years of age; data for 1966-70 are for adolescents 12-17 years of age, not 12-19 years.
Source: CDC/NCHS and NHANES.

Age-adjusted* prevalence of overweight and obesity among U.S. adults, age 20-74 years



*Age-adjusted by the direct method to the year 2000 U.S. Bureau of the Census estimates using the age groups 20-39, 40-59, and 60-74 years.

Complications of Obesity

Many physical and psychological problems are associated with obesity. Overweight kids are more likely than normal weight kids to face health problems including:

Immediate risks (during childhood):

Physical:

Asthma
Hypertension
Joint injuries
More frequent infections

Psychological:

Teasing
Depression/anxiety symptoms
Poor self-esteem
Eating problems (binge eating and purging)

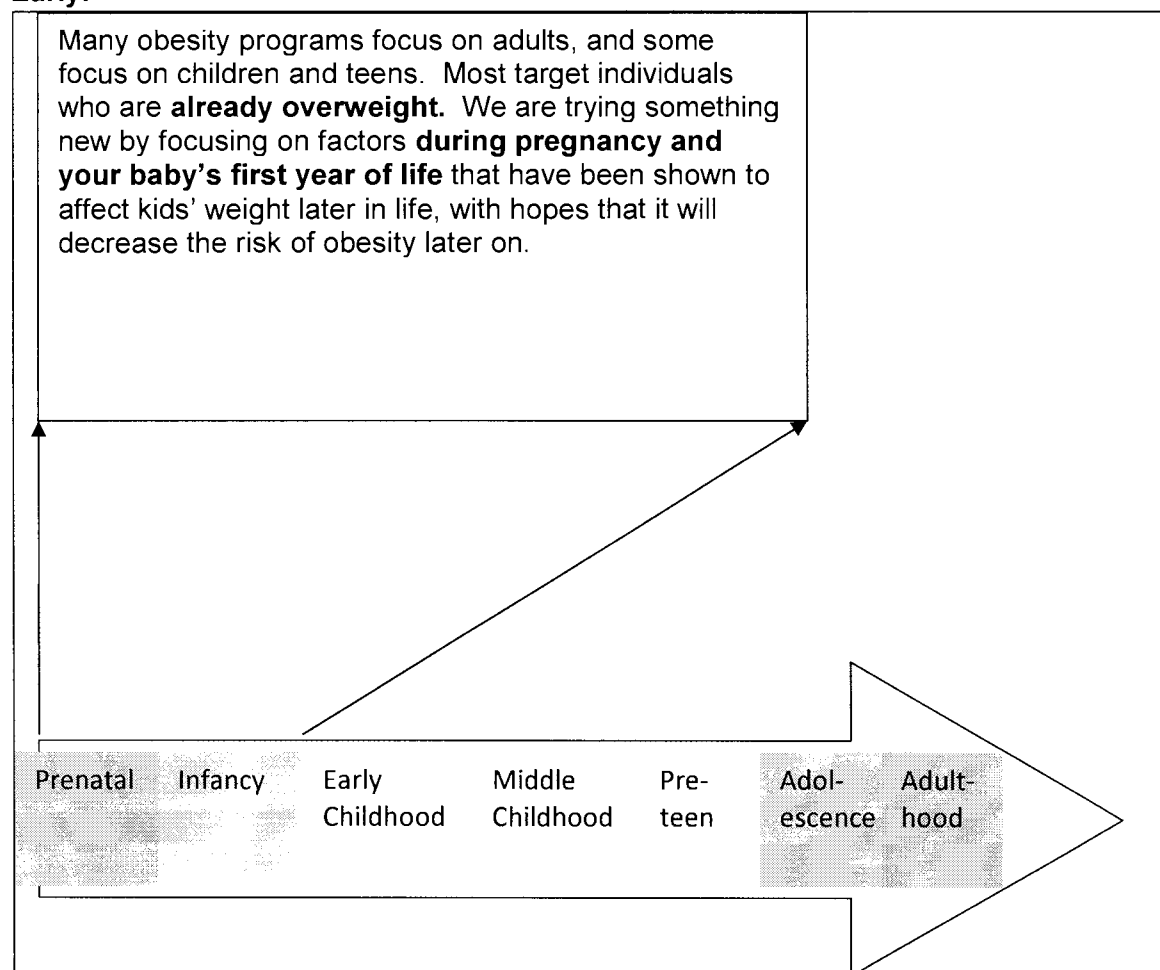
Future risks (as overweight children become adults):

Physical:

Cardiovascular disease (heart attack, stroke)
(Type II) anxiety
Many types of cancer (colon, ovarian, breast)

Psychological:

Mood disorder (depression, Diabetes
Low self-esteem
Relationship problems
Job discrimination
Eating disorders

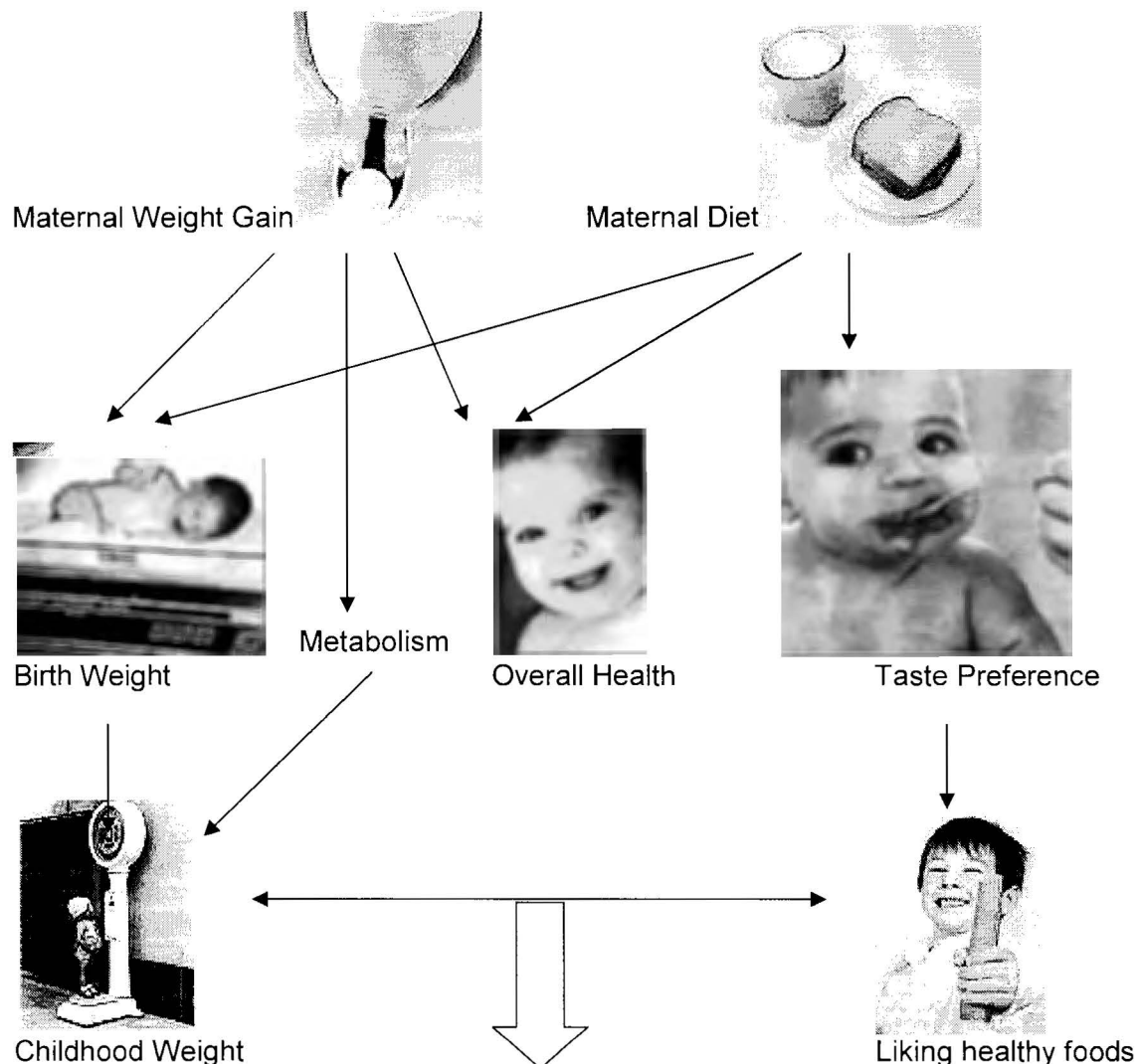
**Start
Early!**

This Program:

| Session | Topic | Time |
|----------------|-------------------------|--------------------|
| 1 | Introduction to Program | First Trimester |
| 2 | Healthy Pregnancy | Second Trimester |
| 3 | Preparing for Birth | Third Trimester |
| 4 | Infant Feeding | 2-month Well-visit |
| 5 | Introducing Solid Foods | 4-month Well-visit |
| 6 | Food Meanings | 6-month Well-visit |

How does pregnancy influence a child's health throughout life?

Pregnancy impacts birth weight, which tracks into childhood and adulthood, and taste preference, which can impact children's eating habits. Taking steps during pregnancy to set your child up to achieve a healthy weight and have healthy eating habits are proactive steps in raising a healthy child.



Physical:

Asthma
Hypertension
Joint injuries
More frequent infections

Childhood Effects of Weight

Psychological:

Teasing
Depression and anxiety
Poor self-esteem
Eating problems (binge eating and purging)

How does the first year impact a child's health throughout life?

In much the same way, a child's weight and eating habits during his or her first year has lasting effects on behavior and health throughout childhood and adulthood:



Breast vs. Bottle



Introducing solid foods



Exposure to foods



Food as reward



Eating Habits: liking healthy foods, trying new foods



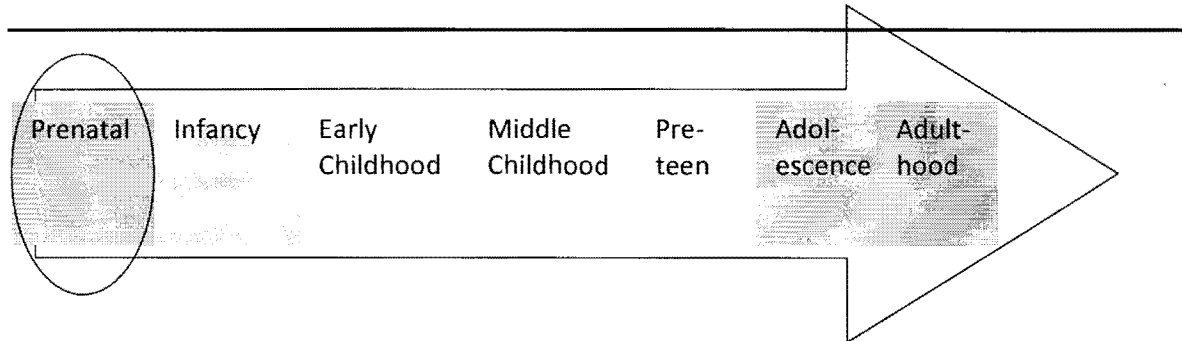
Healthy Baby Weight



Healthy-weight kids with healthy eating habits

Session 2:**Healthy pregnancy for Healthy Kids**

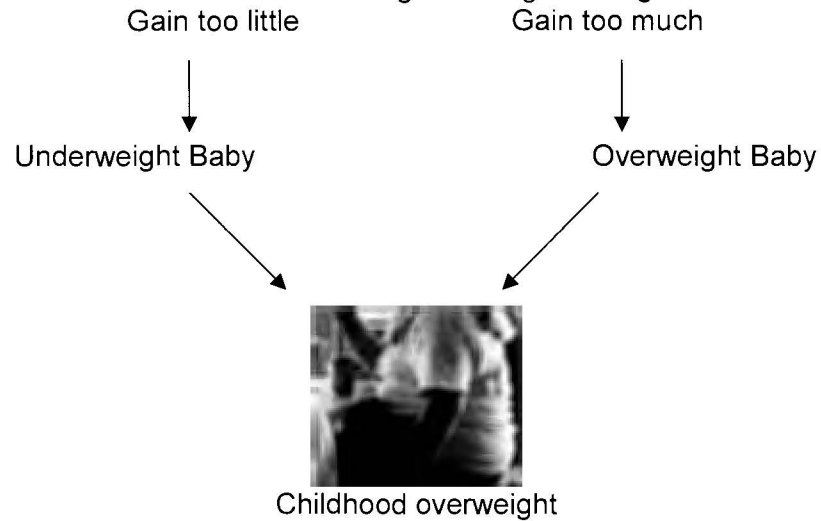
- Weight gain during pregnancy
- Diet during pregnancy
- Exercise during pregnancy
- Stress during pregnancy



Effect of Maternal Weight Gain on Birth Weight and Energy Balance

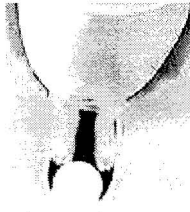
Healthy weight gain during pregnancy is important for your baby's birth weight and for how your baby learns to use energy:

There is a range of recommended weight gain for pregnant women to have a healthy child. In general, though, gaining **too much** or **too little** weight result in high and low birth weight, which both lead to a risk of becoming *overweight* during childhood.

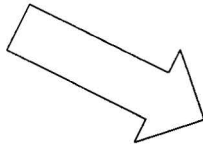


Weight Gain during Pregnancy

Weight gain during pregnancy impacts both a baby's **birth weight**, and a baby's tendency to **burn or conserve** their energy



Birth weight



STORING verses USING calories

We know that weight gain affects birth weight. Interestingly, both **overweight** and **underweight** babies are at greater risk for becoming overweight as children, compared to normal weight babies. Women who gain too much weight are also at risk for diabetes, high blood pressure, and varicose veins.

One theory explaining why underweight babies become overweight may involve a child's tendency to burn or conserve energy. If a mom eats too little during pregnancy (and as a result doesn't gain enough weight), then the fetus experiences a situation of 'food scarcity,' in which the infant must conserve energy (calories). Despite being underweight at birth, these children likely receive plentiful nutrition after birth, yet their bodies are still pre-set to use energy sparingly. **This tendency to conserve energy may predispose a child to gain excess weight.**

Healthy Weight Gain

The amount of weight a woman is recommended to gain during pregnancy depends on her pre-pregnancy weight status: underweight women need to gain a little extra weight, and overweight women should gain slightly less weight.

| Before Pregnancy: | Recommended Weight Gain: |
|---------------------------|--------------------------|
| Underweight (BMI <18) | 28-40 lbs |
| Normal Weight (19<BMI>25) | 25-35 lbs |
| Overweight (BMI>25) | 15-25 lbs** |
| Obese (BMI>29) | 11-20 lbs** |

**While you don't want to gain too much weight, it is important for your baby's health to not try to lose weight during pregnancy, as it could harm your baby.

Current Weight _____ **Weight gain recommendation** _____

For women who begin pregnancy at a normal weight, you should gain about 4-6 pounds during the first trimester, and then about 1 pound per week throughout the second and third trimesters.

For women who begin pregnancy overweight, aim to gain about 1 pound every other week during the second and third trimesters.

March of Dimes, http://www.marchofdimes.com/pnhec/159_153.asp

How to Gain the Right Amount of Weight

1. Eating for 2?

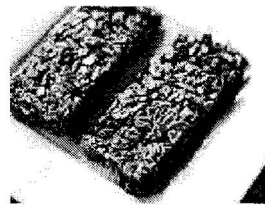
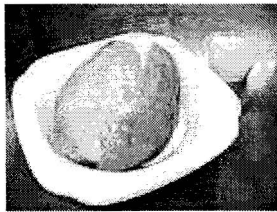
The actual increase in calories that is recommended during pregnancy is:

_____ kcal/day

(300)

Which is equal to:

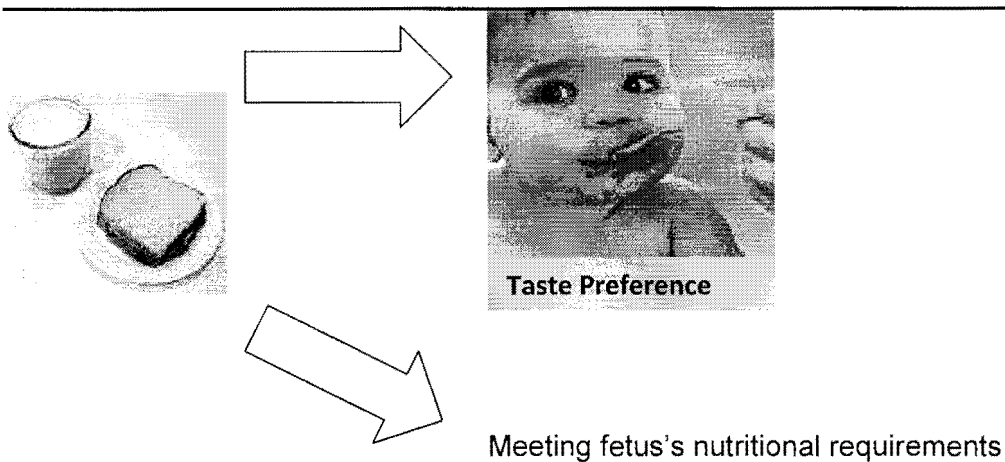
- 1 baked potato
- 1 average turkey sandwich on bread
- 2 granola bars



2. Monitor your weight *not more than once per week*. Some women find it helpful to weigh themselves, and others like to wait until they see their doctor and get weighed then. Either way is fine.

3. If you are following a balanced diet and internal hunger cues, above all, **don't be distressed if your weight gain doesn't fall within the exact range.** Sometimes even with proper diet and exercise, some women's bodies may gain more or less weight than others; use these recommendations as guidelines, not strict rules!

Even though it is hard to ensure perfect weight gain, the good news is that DIET impacts kids' health regardless of how much weight the mother gains

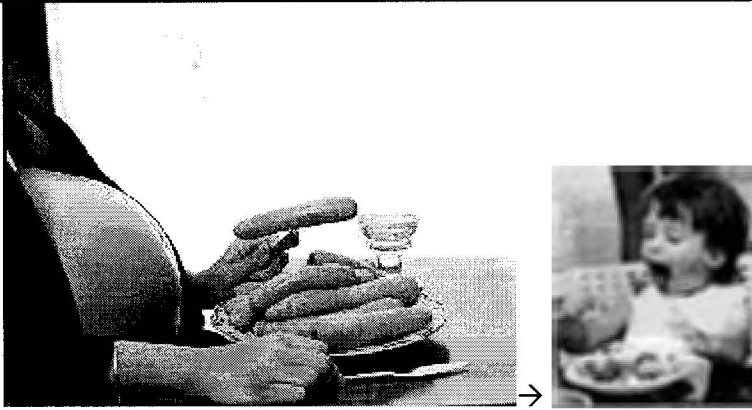


A healthy diet ensures that a fetus's nutritional requirements are being met, and, new research indicates that a mom eating healthy flavors can help teach a baby to like those same flavors.

In-utero exposure to certain flavors can make a baby react more positively to that flavor when presented with it after birth. Babies whose mothers drank carrot juice were more likely to enjoy milk with a carrot flavor than babies whose mothers didn't. This may in fact be true for a variety of flavors, including healthy foods like fruits and vegetables.

So, mom eating healthy foods during pregnancy can set your baby up to enjoy healthy foods after pregnancy!

Effect of Maternal Diet on Taste preference



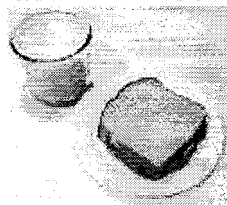
New research shows that **what a mom eats during her pregnancy can impact her baby's taste preference after birth**. Babies whose mothers drank carrot juice during pregnancy ended up liking carrot-flavored formulas more than babies whose moms didn't drink carrot juice. This is good support that in-utero exposure to flavors can guide what flavors a baby likes.

Flavor suggestions for pregnancy:

Carrots, leafy green vegetables, orange fruits and vegetables



More on Diet during Pregnancy



Recommended servings from various food groups are provided by the American Dietetic Association, and listed below. In general, women should eat plenty of whole grains, green leafy vegetables and yellow vegetables to boost their vitamin, mineral, and fiber intake. Also, enough servings of meat, poultry, low-fat dairy, and/or legumes will help make sure that women are meeting their protein needs:

| Group | Serving Size | Servings |
|---|--|-----------|
| Bread, cereal, rice and pasta group | 1 slice of bread | 9 |
| | ½ cup cooked rice, pasta or cereal | |
| | 1 cup ready to eat cereal | |
| Vegetable Group | 1 cup raw, leafy vegetables | 4 or more |
| | ½ cup other vegetables, raw or cooked | |
| | ¾ cup vegetables juice | |
| Fruit Group | 1 medium apple or banana | 3 |
| | ½ cup chopped fruit | |
| | ¾ cup fruit juice | |
| Milk, yogurt, and cheese Group | 1 cup milk or yogurt | 2-3 |
| | 1.5 oz natural cheese | |
| | 2 oz processed cheese | |
| Meat, poultry, fish, nuts Dried beans, and eggs Group | 2-3 oz lean cooked meat, protein or fish | 2 (6 oz) |
| | ½ cup cooked beans | |
| | 1 egg, ½ cup tofu, 1/3 cup nuts | |
| | 2 T. peanut butter | |

American Dietetic Association, Position of the ADA: Nutrition and Lifestyle for a healthy pregnancy outcome, <http://www.eatright.org/ada/files/Pregnancynp.pdf>

Eating **natural** foods is better than eating processed food. Natural foods have more vitamins, minerals, and nutrients. Try to eat foods that don't have a lot of preservatives, refined sugars, refined flours, hydrogenated oils, sweeteners, food colors, or flavorings.

Exercise during Pregnancy



Contrary to previous belief, unless your doctor says otherwise, it won't harm or jostle your baby to engage in physical activity. According to American College of Obstetrics and Gynecology guidelines, pregnant women should try to exercise **moderately for at least 30 minutes on most, if not all, days.**

Why Exercise?

In the short term, exercise helps all of us feel better physically and emotionally, and the calories burned helps prevent excessive weight gain. People who exercise regularly develop stronger muscles, bones, and joints. And over time, the benefits of regular exercise are even more impressive: lower risk of premature death, heart disease, and other serious illnesses.

For pregnant women, however, exercise has these benefits and more. There is evidence that **exercise can help prevent gestational diabetes**, a form of diabetes that sometimes develops during pregnancy. And for women who already have gestational diabetes, regular exercise is recommended along with changes in diet to help bring the disease under control. **Exercise during pregnancy can help relieve stress and build the stamina needed for labor and delivery.** It's also worth mentioning that **exercise can be very helpful in coping with the postpartum period.** Exercise can help new mothers keep "baby blues" at bay, regain their energy and lose the weight they gained during pregnancy.

Exercise Tips

*Discuss exercise with your doctor before you start.

*Pick types of exercise that you enjoy. Brisk walking, running, hiking, and dancing all provide cardiovascular benefits. Swimming has these benefits along with the added benefit of being low impact, and providing support for your growing body. Some gyms may offer yoga or exercise classes specifically for pregnant women. Seek activities that will keep you motivated to continue exercising throughout your pregnancy.

*Exercise that puts you at risk for injury or getting hit in the abdomen should be avoided. These include horseback riding, downhill skiing, ice hockey, kickboxing, and soccer. It is also important to avoid **exercises that require you to lie flat on your back. Lying on your back can restrict the flow of blood to the uterus and endanger your baby. Finally, never scuba dive.**

* Pay attention to how you feel during exercise. Don't try to overdo it. If you are just starting, try to build up your fitness gradually. If you have any serious problems, such as vaginal bleeding, dizziness, or headaches, or changes in fetal movements, stop exercising and contact your doctor right away.

March of Dimes, http://www.marchofdimes.com/pnhec/159_515.asp

Stress during pregnancy



Taking care of yourself for your baby

Pregnancy is a stressful time for many women. You may be feeling happy, sad and scared—all at the same time. It's okay to feel like you do. Very high levels of stress may contribute to preterm birth or low birth weight in full-term babies, so you should try to learn how to cope with stress.

Recognize that you do indeed feel stressed. Accepting the fact you are stressed and identifying the situations that cause stress are the first steps in helping reduce it. Some other ways of reducing stress and coping with stress are:

- Eating regularly and nutritiously and drinking lots of water (6-8 glasses each day).
- Resting when you can—and when your body needs it.
- Relaxing by meditating, listening to music or writing in a journal.
- Resisting any urges to drink alcohol, smoke or take herbal products or drugs (except those prescribed by your health care provider).
- Staying away from stressful people and stressful situations, when possible.
- Talking—to your partner, friends, relatives, health care professionals, and your employer. If you feel overwhelmed, talk with a trained counselor or other mental health professional.
- Going to all your prenatal care appointments. This will give you the reassurance that everything is okay with your baby or let your health care provider know about a problem while there is still time to do something about it. You'll feel less stressed because you know you are doing the best for your baby.

March of Dimes, http://www.marchofdimes.com/pnhec/159_527.asp

Intervention 3

Preparing for Birth

- Breast versus bottle feeding
- Difficulties with breast feeding

Breast vs. Bottle on Weight and Health



Growing evidence shows that any breastfeeding, and breastfeeding for longer durations, is protective against obesity and related conditions.

The protective effect of breastfeeding for children was shown across children of different ages, including children up to age 14 years, meaning that for children of various ages, being breastfed versus never breastfed decreased their risk of becoming overweight.

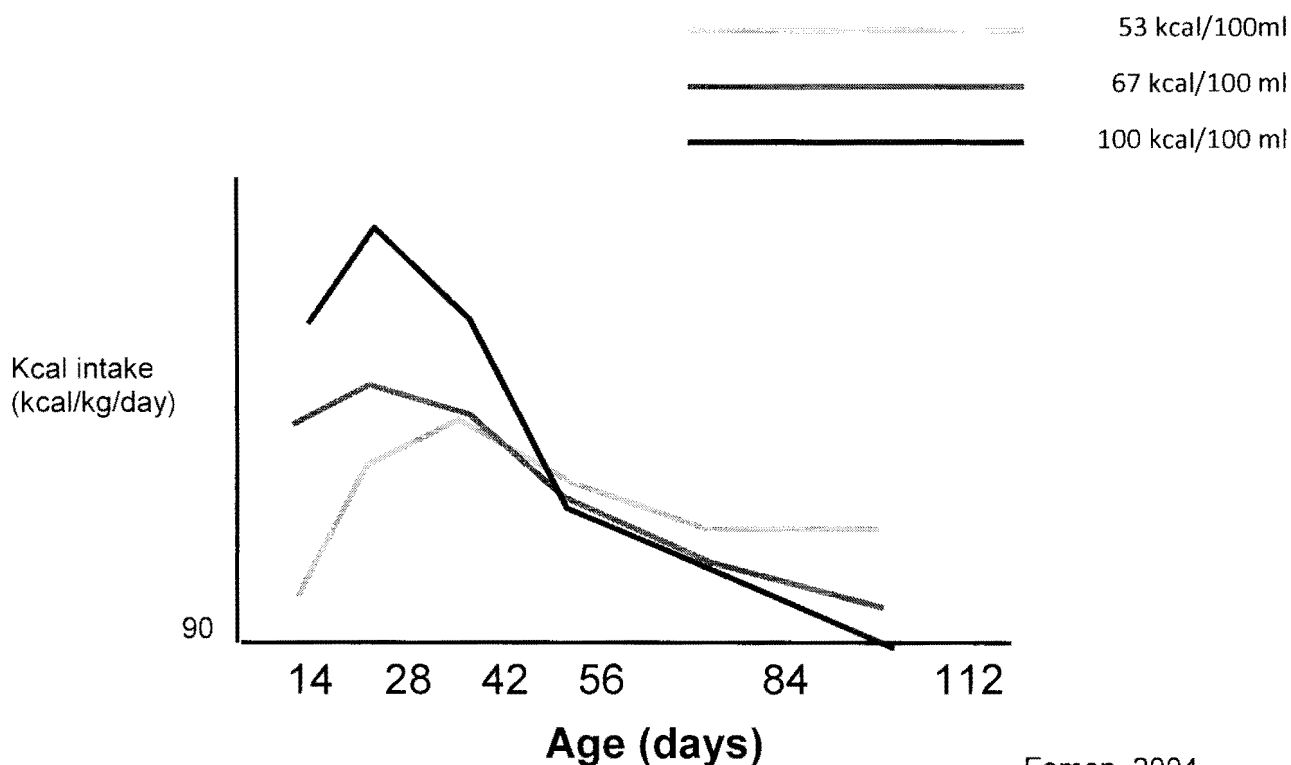
Children who are breastfed compared to never breastfed are also less likely to suffer from diabetes, asthma, and allergies, diseases which are also increasingly common compared to several decades ago.

Because of the protective effect of breastfeeding against childhood and subsequent overweight, and other health problems, it is recommended that breast milk remain the primary source of a baby's energy and nutrients through 6 months of age.

As solid foods are introduced, they should be added to complement, as opposed to replace breast milk throughout the baby's first year.

Intuitive Eating

Intuitive eating is when a person eats according to their intuition, usually in accordance with physiological signals. Babies are very good at this! When fed formula with different calorie content, infants adjusted their intake to meet their caloric needs. With denser formula, infants drank less, and with less-dense formula, they drank more.



Fomon, 2004

This is why parents need not worry if their child eats more or less on a given day. Meeting expected growth and weight gains, as opposed to the amount eaten or drank per day, should be the indicator for health among babies!

How does this relate to breast feeding?

The mechanism for why breastfeeding protects against overweight is unknown, but it is suspected that the protective effect of breastfeeding is in part because breastfeeding is more conducive to intuitive feeding than feeding based on external cues. That means that babies who breastfeed are more likely to eat when they are hungry and stop when they are full, whereas bottle fed babies may be encouraged to drink specific amounts of energy, which may not go along with their internal hunger and thirst signals (CDC).

Potential Barriers to Breast Feeding

Breast feeding can be difficult. Some difficult aspects of breastfeeding may include:

1. Milk won't come
2. Nipple pain
3. Breast engorgement
4. Breast infection

The best way to prevent engorgement is to nurse often. Some suggest not going more than three hours without nursing and not skipping night feedings. When breasts are severely engorged, the baby often cannot latch on properly. Pumping or manually expressing some breast milk can help reduce engorgement, allowing the baby to suckle, which will help alleviate the swelling and prevent future episodes. Also, some women find a warm shower just before a feeding helps relieve some discomfort and facilitate let down. Massaging the breasts as the baby nurses can help get out as much milk as possible.

Many times, nipple pain and infection are caused by improper latching-on. If you feel pain when breastfeeding, do not continue and let it get worse. Rather, break the suction and try to reposition the baby for a proper latch, which is when the entire nipple is in the mouth. If you continue to have problems, contact your doctor. If you ignore the pain, it can progress to the point where the nipple is so sore that breastfeeding is very uncomfortable. There's no reason to let it get to that point. Here are a few suggestions on steps you can take to ease the pain of nursing while you heal:

- ☐ **Nipple creams.** There are over-the-counter preparations as well as prescription strength. These are absolutely safe for your baby and do not need to be washed off before nursing.
- ☐ **Breast shells.** They not only protect the nipple from rubbing against clothing, but they also help the nipple cream stay on the skin.
- ☐ **Tea bags.** They contain lanolin, which is very soothing. Moisten them and place on nipples for a few minutes.
- ☐ **Avoid soap.** Soaps are drying and can exacerbate cracking. Wash once a day, in the shower, just by letting the water flow over your nipples.

<http://www.breastfeed.com/articles/overcoming-difficulties-53>

Sometimes, no matter how motivated a mom might be, breastfeeding simply won't work. Most importantly, this is not your fault! And, there are ways to maximize health when bottle feeding:

The average infant needs 4 oz of milk every 4-6 hours.

If your baby doesn't finish all the formula in the bottle within one hour, throw it away. Give her a new bottle of fresh formula at the next feeding. Bacteria can contaminate unfinished formula and make your baby sick.

You might also want to get an inexpensive bottle warmer. It will heat the formula to just the right temperature. Do not put a baby's bottle in a microwave. Microwaves often heat unevenly. A "hot spot" of formula could burn your baby's mouth or throat.

You may have to try different bottle and nipple combinations to see which your baby likes. There are many options. Clean and store the bottles and nipples as recommended by the manufacturer.

Do not add extra water to formula to make it last longer. Your baby will not get the nutrition she needs. And she can have seizures, become unconscious, or even die from too much water.

http://www.marchofdimes.com/pnhec/30590__30610.asp

4. Infant and Newborn feeding

- Nutritional intake for newborns
 - Feeding
 - Responding to fussiness
 - Activity for infants
-

Nutritional Intake for Infants

Infants' diets vary from day to day. As we talked about before, infants are very good at subconsciously "counting calories." Nutrition is generally good throughout the first two years, but energy intake tends to exceed expenditure by an increasing amount as toddlers grow older.

-
- From birth through 24 months, the child assumes the eating habits of the family.
 - It is recommended that babies exclusively breastfeed for the first 4-6 months and up to 1 year if possible.
 - The quantity of milk a baby needs depends on the child's weight, growth rate, and metabolism. Most newborns will drink 2-3 fluid ounces per day for every pound of body weight. For example a 10 pound baby will drink between 20-30 ounces of milk per day.
 - Most babies consume ~4-5 oz, 4-6 times per day. However, there is no need to be too particular about exact amounts, because infants are very good at self-regulation.
 - Until 6 months of age, no juices or additives to bottles are needed.
 - Rice cereals can be introduced around 4-6 months.
 - Being eager to have your baby finish the bottle may encourage overeating.
 - Cues that your infant is full include: turning his/her head away from nipple, releasing the nipple, or falling asleep.

Responding to Fussiness

Infants cry for a number of reasons. What are some of the reasons your infant cries? Can you tell the difference in terms of what he/she needs based on his or her cry?

-
- It is important to remember that not all crying means hunger.
 - Even so, it is easy to settle a fussy baby with food. Food may soothe or calm the infant even when he or she is not hungry. This not only promotes the infant to 'overeate' and ignore internal hunger signals, but it also builds a connection between food and comfort, at a very young age.
 - Some other ways of soothing a fussy baby who is not hungry are rocking, rubbing, light massaging, cuddling, and listening to music. Car rides and soft noises, like running water, sometimes can be soothing. Record sounds or buy CDs that calm your baby.

Activity for Infants

It may sound silly to talk about 'physical activity' when your baby is only two months old, but it is important to develop strategies that encourage infants to be active. Some basic ideas for activity for very young babies include: crib mobiles, encouraging reaching and stretching, supervised belly play or tummy time.

The best way to help your newborn build his/her muscles is to give him/her some tummy time while he/she is awake. While your baby is on his/her stomach, extend his/her arms and place a rolled-up receiving blanket underneath his/her chest and arms. Keep your newborn on his/her belly for a few seconds at a time each day until he/she can work his/her way up to holding his/her head up for longer. You can motivate them by bringing yourself down to his/her eye level so he/she can look at you. You can also try placing a rattle or other attractive toy in front of him/her to get his/her attention.

http://www.marchofdimess.com/pnhec/298_33823.asp

Healthy Habits start early!



5. Introduction of solid foods

- Introduction of solid foods
 - Modeling
 - Activity
-

Introducing solids



Timing: 4 to 6 months of age is a time when most infants are getting ready for soft 'solid' foods. When it is time to start introducing solid foods, it is recommended that easy solid foods, like fruits, baby cereals, and other soft foods, be added to complement, as opposed to replace, breast milk, throughout the baby's first year. So, between 6 months and 1 year, solid foods can gradually be added to supplement breast milk. Breast-milk consumption will gradually decrease as solid food intake increases. This is called complementary feeding.

Repeated Exposure as Important!

Babies have a natural taste preference for sweet and salty foods, and a biological distaste for bitter and sour foods. Infants tend to resist new foods. Because of this, it can take multiple tries (up to 10 tries) to determine if your baby likes a new food.

- Because children like and eat what is familiar, it is important to present new foods on **multiple** occasions even if an infant appears to dislike it.
- The extrusion reflex (protruding lip and spitting out food) is **normal** and does not always mean that your baby doesn't like the food.
- **Exposure** to foods and flavors has been consistently shown to impact a baby or child's enjoyment of particular foods. In older children, it can take up to 10-20 times of seeing and tasting a food before they start to like it.

Establishing Good Habits:

It is never too early to start feeding your baby the foods that you hope he or she will enjoy and eat a lot of during their life. Offering and modeling simple, fresh, natural foods, like fruits, dry cereal, and cooked vegetables will aid in getting your child to accept and like these foods as they grow older.

Avoiding highly palatable foods, like sugary drinks and candies and foods high in saturated fat, like 'combo dinners,' baby desserts, French fries and milkshakes, even though they may be appealing to you and your child will help him or her continue to make similar choices as a child and adult.

Avoid the "clean plate syndrome." Forcing your child to eat all the food on his/her plate even when he/she is not hungry is not a good habit. It teaches your child to eat just because the food is there, not because he/she is hungry.

Juice

Juice has been shown to impact weight gain in children. In infants also, excessive juice is a risk for obesity. Recommendations for juice drinking include:

- Giving only 100% juice.

- Waiting until 6 months of age to introduce juice.
- Drinking juice only from a cup, not from a bottle.
- Limiting the amount of juice to 3 ounces initially and 4-6 ounces per day, for 1-6 year olds.
- Sugar sweetened beverages provide little nutritional benefit to children. Their use as snacks should be restricted. Intake of sugar sweetened beverages (fruit drinks other than 100% fruit juice) is associated with excess weight gain and obesity.
- Fruit juice should not be used as a substitute for meeting recommended dietary intake for whole fruits and vegetables.

Modeling

Parents' eating habits influence baby's choices, even at this young age. What ways can you model healthy eating habits for your baby?

Types of activity:

1. Traditional exercise



AND

2. Lifestyle exercise



-
- Lifestyle exercise has been shown to be equally, if not more important, in terms of excess weight gain.
 - Activities such as walking, playing with the infant, and using the stairs instead of the elevator, not only promote wellness in you, but help to model healthy active behaviors for your infant.
 - **Activity for babies:** Belly play time, sitting with support, encouraging reaching and holding objects, play gyms, and minimizing TV, are all ways to promote healthy activity in your baby.



6. Food Meaning

- Food associations
 - Healthy eating practices for babies
 - Activity
-

Food Meanings



As kids grow older, food starts to have many meanings in addition to physical sustenance. Babies are more readily able to eat when they are hungry and stop when they are full, compared to adults, who are in general more likely to eat dessert even after we are full from dinner.

Examples of food meanings aside from addressing physiological hunger are:

- Food for celebration
- Eating when stressed
- Rewarding kids and ourselves with food
- Expressing love through food (giving food as gifts)
- and many more

While it can be difficult and impossible to completely avoid alternative meanings of food, being aware of **how we teach our kids to treat food (and treat themselves through food) can have lasting impacts on your child's eating habits**, food preference, and subsequent physical and psychological health.



Parent and Child Roles during Feeding

Parents and children play different roles with regard to the child's eating behaviors. The parents' job is to offer the child a healthy variety of foods and a supportive eating environment. The child's job is to decide when and how much to eat.

During meal times, the parents should act as role models. Families should eat together at the table if this is possible, a behavior that should continue into the child's school years.

Also, turning off the TV during meals promotes interaction and quality time during meals. Finally, having the TV in an area that is separate from the dining area eliminates the temptation to have the TV on during meal time.



Healthy Eating Practices

Emphasize eating skills and experiences. “Eating” involves all 5 senses for infants—touch, smell, taste, sight, and sound.

As your child gets older, establish a typical eating schedule that includes meals and snacks. Children should not snack in front of the television, in the car, or simply out of boredom.

Emphasize fruits and vegetables, and offer them at every meal.

Introduce a variety of meats as your child grows older.

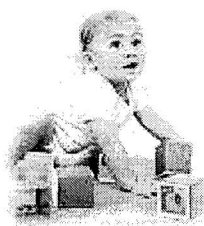
Variety—offer many new foods and textures, and familiar foods prepared in new ways. Offer finger foods and table foods. Offer real, regular, adult foods (diced or pureed), and not just kid versions of foods.

Some foods are a choking hazard (hot dogs are a good example). Parents should ensure that foods given to your infant are presented in a style and quantity that will not present an airway hazard!

Finally, very young children do not need dessert. Avoiding this habit early can help reduce the chance of excess weight gain in your child.

Activity

- The goal is to promote activity and reduce sedentary activity.
- Let your child sit up without support and encourage crawling.
- Minimize TV and stationary devices. There is a high prevalence of TV watching in American homes, including among infants and toddlers.
- There is a relationship between TV, video games, home computers, and obesity. Time spent in front of a monitor is sedentary time.



APPENDIX 4.
FAMILY CENTERED CARE QUICK REFERENCE

Family-Centered Care*

at National Naval Medical Center (NNMC)



**Quick references
for women's,
expectant mothers',
and newborn
health care...**

Your and your family's needs and best interests are at the heart of our superior health care. Across the lifespan, Family-Centered Care is about:

Personalized care...respect, empowerment, choices, and flexibility.

Commitment...coordinated care between providers, pain management, private birthing rooms, lactation support, and respect for cultural differences are just a few examples of how we address your unique needs.

Communication...providers who listen to your questions and your family's concerns and help develop individualized treatment plans.

Our Family-Centered Care approach ensures that the best possible personalized and coordinated care is delivered to you. We recognize the entire family as an integral part of treatment. The quick references that are linked below showcase our excellence in three of our Family-Centered Care environments.

*Family-Centered Care is a Department of Defense initiative. [Link to more on DoD's Family-Centered Care.](#)

**Your Quick Reference to ...
Obstetrics and the
Mother & Infant Care Center**

Having your baby at National Naval Medical Center, assures you that experienced OB/GYN specialists will provide you and your newborn with state-of-the-art treatments, using up-to-date technology. Our OB services are designed around the concept of "Family Centered-Care" which recognizes the importance of family support, participation, and choice, before, during, and after the birth of your baby.

OBSTETRICS

NNMC is the Tri-Service referral hospital for obstetrics, high-risk pregnancies, and deliveries, for the National Capital Region and national and international commands.

Prenatal (before birth) care at NNMC is personalized, and includes a comprehensive educational program to prepare you and your family for the process of becoming parents.

New Technology and Special Services:

NNMC's obstetrics professionals use the newest technology and equipment, such as 4-dimensional ultrasound and video teleconferencing. We also offer counseling services to families with a history of genetic (inherited) disorders, including pre-conception counseling, and prenatal genetic counseling and diagnostic testing.

**MOTHER & INFANT CARE
CENTER (MICC)**

NNMC's MICC delivers more than 1,800 babies each year, and is one of the largest birthing centers in the Department of Defense medical system. Our MICC embodies the most modern concepts in childbirth philosophy, technology, and design. "Family-Centered Care" is integrated with advanced

medical technology to ensure a safe, comfortable, and individualized birth experience. Labor, delivery, and recovery all take place in specially-designed birthing rooms with warm, home-like environments, featuring private bathrooms, birthing beds, televisions, pullout sofas, and telephones. Operating rooms with the latest medical equipment are conveniently located for Cesarean deliveries.

After delivery, your family is provided with a private room (at no extra charge) on the Couplet Care Unit where a specially trained nurse cares for mother and baby. These rooms feature the above amenities plus a refrigerator and a state-of-the-art anti-infant-abduction system.

The MICC also offers:

Visitation 24 hours a day, priority-parking passes for new and expectant mothers, lactation (breast-feeding) consulting and education sessions, room service and "Special Delivery" meals.

CONTACT US

*Obstetrics & Gynecology: (301) 295-6672
Mother Infant Care Center: (301) 319-5000*

For all appointments:

*Toll Free: 1-(866) NAVY-MED (628-9638)
Local: (301) 295-NAVY (6289)
Online: www.tricareonline.com*

*Do you have Other Health Insurance (OHI)?
Please report your OHI Policy Number to receive your full benefits, and to allow NNMC to be reimbursed for some services rendered*

National Naval Medical Center
8901 Wisconsin Avenue
Bethesda, MD 20889-5600
(301) 295-CARE 1-(800) 526-7101
www.bethesda.med.navy.mil

NNMC is accredited by the Joint Commission on the Accreditation of Healthcare Organizations (JCAHO).

Your Quick Reference to ... High Risk Pregnancy and the Neonatal Intensive Care Unit

National Naval Medical Center (NNMC) is the referral care center for high-risk pregnancies, deliveries, and neonatal intensive care for the entire military. We support and practice Family Centered Care which recognizes the entire family as an integral part of the healing period.

HIGH-RISK PREGNANCY

A pregnancy may be considered high-risk for many reasons, such as if the mother-to-be is over 35, diabetic, has a history of miscarriages, had a premature delivery in the past, has an infection or chronic condition such as high blood pressure or compromised immune system, or if multiple fetuses or genetic complications are detected.

Expectant mothers with high-risk medical needs from the National Capital Region and several commands in Europe, are often referred to NNMC for their OB/GYN care. Specialists in obstetrics and gynecology diagnose and treat both acute (short-term) and chronic (long-term) conditions, using state-of-the-art equipment, such as 4-dimensional ultrasound and video teleconferencing.

Services offered include:

Prenatal diagnostic testing, genetic counseling, pre-conception counseling, childbirth education, maternal-fetal medicine consultation, and perinatal loss counseling.

NEONATAL INTENSIVE CARE UNIT (NICU)

NNMC's Level III NICU provides the highest level of care for newborns at risk from the National Capital Area, as well as those transported from local hospitals and overseas locations.

Some of the conditions that may cause a newborn to be referred to the NICU are premature birth, low birth weight, infection, respiratory problems or birth defects.

Designated a "Center of Excellence" by the DoD, and staffed by physicians in neonatal medicine, including three board-certified neonatal specialists who apply the most advanced medical technologies available, the NICU offers around-the-clock intensive care for over 400 high-risk critically ill newborns each year.

When a newborn is ready to leave the NICU, a Discharge Planner, Social Worker and NICU staff member work closely with parents to provide home-care training, physical therapy, and developmental testing.

In 2003, NNMC's Mother & Infant Care Center and Neonatal Intensive Care Unit were featured on "THE DISCOVERY CHANNEL" for their exemplary work and service to military medicine.

CONTACT US

*Obstetrics & Gynecology: (301) 295-6672
Neonatal Intensive Care Unit: (301) 319-6428*

For all appointments:

*Toll Free: 1-(866) NAVY-MED (628-9638)
Local: (301) 295-NAVY (6289)
Online: www.tricareonline.com*

Do you have Other Health Insurance (OHI)? Please report your OHI Policy Number to receive your full benefits, and to allow NNMC to be reimbursed for some services rendered

National Naval Medical Center
8901 Wisconsin Avenue
Bethesda, MD 20889-5600
(301) 295-CARE 1-(800) 526-7101
www.bethesda.med.navy.mil

*NNMC is accredited by the Joint Commission on the Accreditation of
Healthcare Organizations (JCAHO).*

Your Quick Reference to ... Women's Health Care

National Naval Medical Center (NNMC) is committed to meeting the health care needs of women of all ages, providing state-of-the-art comprehensive care and support for women's health issues such as birth control, sexually transmitted diseases, cancer, menopause, osteoporosis, and heart disease. Our services are designed to promote individualized care that recognizes the importance of family-centered support, participation, and choice.

Gynecology

Specialists in gynecology diagnose and treat both acute (short-term) and chronic (long-term) conditions, utilizing state-of-the-art equipment such as 4-dimensional ultrasound and video teleconferencing. Our health professionals also use the latest developments in gynecological procedures, treatments and diagnostic tools.

Services offered include:

- *Contraceptive counseling*
- *Women's health maintenance (pap smears, breast exams)*
- *Diagnosis and treatment of gynecologic disorders*
- *Hormone-replacement therapy (HRT)*
- *Menopause education*
- *Women's health classes*

Breast Care

In collaboration with National Cancer Institute and the Uniformed Services University of Health Sciences,

the National Capital Area Breast Care Center at NNMC is a "Center of Excellence" in breast cancer research, and focuses on incorporating superior methods of early detection, comprehensive treatment, and long-term surveillance of breast cancer. Our multidisciplinary staff is dedicated to providing you and your family with a network of skilled professionals, support groups, social workers and information services to ensure the best possible physical and psychological rehabilitation.

The Breast Care Center also provides:

Detection and follow-up screening, high-risk assessment classes, pre- and post-operative care, case management, educational resources, and physical therapy.

Contact Us

Breast Care Center: (301) 295-3899

Obstetrics & Gynecology: (301) 295-6672

Mother Infant Care Center: (301) 319-5000

For all appointments:

Toll Free: 1-(866) NAVY-MED (628-9638)

Local: (301) 295-NAVY (6289)

Online: www.tricareonline.com

Do you have Other Health Insurance (OHI)?

Please report your OHI Policy Number to receive your full benefits, and to allow NNMC to be reimbursed for some services rendered

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8901 Wisconsin Avenue
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APPENDIX 5.
COUNSELING INTERVENTION

Session 1 (Trimester 1 of pregnancy): Obesity Awareness (prevalence, risks, prevention)

Session Objectives

1. Patient will understand program goal of 'starting early' as a means of preventing future child overweight.
2. Patient will discuss weight as it relates to health
3. Patient will learn a variety of factors during pregnancy and the first year of life that may impact their child's weight in the future

Session 2 (Trimester 2 of pregnancy): Healthy Pregnancy (weight gain, diet, exercise, stress)

Session Objectives

4. Continue development of patient rapport and trust
5. Patient will understand factors *during pregnancy* that can impact her baby's weight in the future
6. Patient will feel positive about doing what she can to help prevent her baby from gaining excess weight in the future

Session 3 (Trimester 3 of pregnancy): Breastfeeding

Session Objectives

1. Patient will cite positive behaviors that are helping her baby.
2. Patient will understand benefits of breast feeding.
3. Patient will articulate the benefits of breast feeding.

Session 4 (Month 2 well child-visit): Early infant Feeding

Session Objectives

5. Mother will continue breastfeeding, or
6. Mother will implement healthy bottle feeding strategies.
7. Mother will understand appropriate "physical activity" for young infant.
8. Mother will understand variation in cries and learn how to differentially respond to infant's crying.

Session 5 (Month 4 well child-visit): Introducing solid foods

Session Objectives

4. Mother will learn appropriate timing of introduction of various solid foods
5. Review presentation of different foods types in the context of 'acceptability'.
6. Mother will understand appropriate 'activity' for 4-month old.

Session 6 (Month 6 well child-visit): Developing healthy food relationships in children

Session Objectives

1. Mother will understand that food has various meanings and be able to give examples of food meanings.
2. Mother **can evaluate her child's feeding practices/eating behaviors** as they relate to weight gain and food meanings.
3. Mother is confident in her ability to institute healthy feeding practices and promote healthy eating behaviors in her child.

APPENDIX 6.**MEASURES**

Weight Efficacy Life-Style Questionnaire

This form describes some typical eating situations. Everyone has situations which make it hard for them to keep their weight down. The following are a number of situations relating to eating patterns and attitudes. This form will help you identify the eating situations which you find the hardest to manage.

Read each situation listed below and decide how confident (or certain) you are that you will be able to resist eating in each of the difficult situations. In other words, pretend you are in the situation right now. On a scale from 0 (not confident) to 9 (very confident), choose ONE number that reflects how confident you feel now about being able to *successfully resist* the desire to eat. Write this number down next to each item.

Not confident at all that you can
resist the desire to eat

Very confident that you can
resist the desire to eat

0 1 2 3 4 5 6 7 8 9

EXAMPLES

I AM CONFIDENT THAT:

CONFIDENCE NUMBER

- | | |
|---|----------|
| 1. I can control my eating on weekends. | <u>8</u> |
| 2. I can say "no" to snacks. | <u>6</u> |

I AM CONFIDENT THAT:

- | | |
|---|-------|
| 1. I can resist eating when I am anxious (nervous). | _____ |
| 2. I can control my eating on the weekends. | _____ |
| 3. I can resist eating even when I have to say "no" to others. | _____ |
| 4. I can resist eating when I feel physically run down. | _____ |
| 5. I can resist eating when I am watching TV. | _____ |
| 6. I can resist eating when I am depressed (or down). | _____ |
| 7. I can resist eating when there are many different kinds of food available. | _____ |
| 8. I can resist eating even when I feel it is impolite to refuse a second helping. | _____ |
| 9. I can resist eating even when I have a headache. | _____ |
| 10. I can resist eating when I am reading. | _____ |
| 11. I can resist eating when I am angry (or irritable). | _____ |
| 12. I can resist eating even when I am at a party. | _____ |
| 13. I can resist eating even when others are pressuring me to eat. | _____ |

- 14. I can resist eating when I am in pain. _____
- 15. I can resist eating just before going to bed. _____
- 16. I can resist eating when I have experienced failure. _____
- 17. I can resist eating even when high-calorie foods are available. _____
- 18. I can resist eating even when I think others will be upset if I
don't eat. _____
- 19. I can resist eating when I feel uncomfortable. _____
- 20. I can resist eating when I am happy. _____
- 21. I can resist eating when I am bored. _____

Program Acceptability Questionnaire*

Please answer these questions that deal with your reactions to the proposed counseling program. Circle the number that best describes your reactions.

1. Overall, how acceptable do you find the proposed counseling program to be?

VERY UNACCEPTABLE 1 2 3 4 5 6 7 VERY ACCEPTABLE

2. How ethical do you think this counseling program is?

UNETHICAL 1 2 3 4 5 6 7 FULLY ETHICAL

3. How effective do you think this counseling program might be?

VERY INEFFECTIVE 1 2 3 4 5 6 7 VERY EFFECTIVE

4. How likely do you think it is that the counseling program may have negative side effects?

VERY UNLIKELY 1 2 3 4 5 6 7 VERY LIKELY

5. How knowledgeable do you think the counselor is?

NOT KNOWLEDGEABLE 1 2 3 4 5 6 7 VERY
KNOWLEDGEABLE

6. How trustworthy do you think the counselor is?

VERY UNTRUSTWORTHY 1 2 3 4 5 6 7 VERY TRUSTWORTHY

7. How likely are you to recommend this study to a friend?

VERY UNLIKELY 1 2 3 4 5 6 7 VERY LIKELY

**Adapted from Hunsley, J. (1992). Development of the treatment acceptability questionnaire. Journal of Psychopathology and Behavioral Assessment, 14, 55-64.*



Leonard R. Derogatis, PhD

Q[™] *Answer Sheet*

ADMINISTRATOR:

BE SURE THE DEMOGRAPHIC INFORMATION ON PAGE 9 IS COMPLETED.

AFTER THE QUESTIONNAIRE IS COMPLETED, DETACH PAGE 9 BY CAREFULLY TEARING ALONG THE PERFORATED LINE. THEN DISCARD PAGES 1 THROUGH 8 AS YOU WOULD OTHER CONFIDENTIAL DOCUMENTS.



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Product Numb
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INSTRUCTIONS:

The SCL-90-R consists of a list of problems people sometimes have. Read each one carefully and fill in the circle that best describes HOW MUCH THAT PROBLEM HAS DISTRESSED OR BOTHERED YOU DURING THE PAST 7 DAYS, INCLUDING TODAY. Blacken the circle for only one number for each problem. Do not skip any items. If you change your mind, erase your first mark carefully and then fill in your new choice. Read the example before beginning. If you have any questions, please ask them now.

EXAMPLE

0 = Not at all 1 = A little bit 2 = Moderately 3 = Quite a bit 4 = Extremely

HOW MUCH WERE YOU DISTRESSED BY:

Bodyaches ☐ 0 ☐ 1 ☐ 2 ☒ 3 ☐ 4

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0 = Not at all 1 = A little bit 2 = Moderately 3 = Quite a bit 4 = Extremely

HOW MUCH WERE YOU DISTRESSED BY:

1. Headaches
2. Nervousness or shakiness inside
3. Repeated unpleasant thoughts that won't leave your mind
4. Faintness or dizziness
5. Loss of sexual interest or pleasure
6. Feeling critical of others
7. The idea that someone else can control your thoughts
8. Feeling others are to blame for most of your troubles
9. Trouble remembering things
10. Worried about sloppiness or carelessness
11. Feeling easily annoyed or irritated
12. Pains in heart or chest
13. Feeling afraid in open spaces or on the streets
14. Feeling low in energy or slowed down
15. Thoughts of ending your life
16. Hearing voices that other people do not hear
17. Trembling
18. Feeling that most people cannot be trusted
19. Poor appetite
20. Crying easily
21. Feeling shy or uneasy with the opposite sex
22. Feelings of being trapped or caught
23. Suddenly scared for no reason
24. Temper outbursts that you could not control
25. Feeling afraid to go out of your house alone
26. Blaming yourself for things
27. Pains in lower back
28. Feeling blocked in getting things done
29. Feeling lonely
30. Feeling blue

0 = Not at all 1 = A little bit 2 = Moderately 3 = Quite a bit 4 = Extremely

HOW MUCH WERE YOU DISTRESSED BY:

- | | |
|---|-----|
| 31. Worrying too much about things | 1. |
| 32. Feeling no interest in things | 2. |
| 33. Feeling fearful | 3. |
| 34. Your feelings being easily hurt | 4. |
| 35. Other people being aware of your private thoughts | 5. |
| 36. Feeling others do not understand you or are unsympathetic | 6. |
| 37. Feeling that people are unfriendly or dislike you | 7. |
| 38. Having to do things very slowly to insure correctness | 8. |
| 39. Heart pounding or racing | 9. |
| 40. Nausea or upset stomach | 10. |
| 41. Feeling inferior to others | 11. |
| 42. Soreness of your muscles | 12. |
| 43. Feeling that you are watched or talked about by others | 13. |
| 44. Trouble falling asleep | 14. |
| 45. Having to check and double-check what you do | 15. |
| 46. Difficulty making decisions | 16. |
| 47. Feeling afraid to travel on buses, subways, or trains | 17. |
| 48. Trouble getting your breath | 18. |
| 49. Hot or cold spells | 19. |
| 50. Having to avoid certain things, places, or activities because they frighten you | 20. |
| 51. Your mind going blank | 21. |
| 52. Numbness or tingling in parts of your body | 22. |
| 53. A lump in your throat | 23. |
| 54. Feeling hopeless about the future | 24. |
| 55. Trouble concentrating | 25. |
| 56. Feeling weak in parts of your body | 26. |
| 57. Feeling tense or keyed up | 27. |
| 58. Heavy feelings in your arms or legs | 28. |
| 59. Thoughts of death or dying | 29. |
| 60. Overeating | 30. |

0 = Not at all 1 = A little bit 2 = Moderately 3 = Quite a bit 4 = Extremely

HOW MUCH WERE YOU DISTRESSED BY:

- | | | | |
|--|-----------|---------------|---------------|
| 61. Feeling uneasy when people are watching or talking about you | 0 1 2 3 4 | 31. 0 1 2 3 4 | 1. 0 1 2 3 4 |
| 62. Having thoughts that are not your own | 0 1 2 3 4 | 32. 0 1 2 3 4 | 2. 0 1 2 3 4 |
| 63. Having urges to beat, injure, or harm someone | 0 1 2 3 4 | 33. 0 1 2 3 4 | 3. 0 1 2 3 4 |
| 64. Awakening in the early morning | 0 1 2 3 4 | 34. 0 1 2 3 4 | 4. 0 1 2 3 4 |
| 65. Having to repeat the same actions such as touching, counting, or washing | 0 1 2 3 4 | 35. 0 1 2 3 4 | 5. 0 1 2 3 4 |
| 66. Sleep that is restless or disturbed | 0 1 2 3 4 | 36. 0 1 2 3 4 | 6. 0 1 2 3 4 |
| 67. Having urges to break or smash things | 0 1 2 3 4 | 37. 0 1 2 3 4 | 7. 0 1 2 3 4 |
| 68. Having ideas or beliefs that others do not share | 0 1 2 3 4 | 38. 0 1 2 3 4 | 8. 0 1 2 3 4 |
| 69. Feeling very self-conscious with others | 0 1 2 3 4 | 39. 0 1 2 3 4 | 9. 0 1 2 3 4 |
| 70. Feeling uneasy in crowds, such as shopping or at a movie | 0 1 2 3 4 | 40. 0 1 2 3 4 | 10. 0 1 2 3 4 |
| 71. Feeling everything is an effort | 0 1 2 3 4 | 41. 0 1 2 3 4 | 11. 0 1 2 3 4 |
| 72. Spells of terror or panic | 0 1 2 3 4 | 42. 0 1 2 3 4 | 12. 0 1 2 3 4 |
| 73. Feeling uncomfortable about eating or drinking in public | 0 1 2 3 4 | 43. 0 1 2 3 4 | 13. 0 1 2 3 4 |
| 74. Getting into frequent arguments | 0 1 2 3 4 | 44. 0 1 2 3 4 | 14. 0 1 2 3 4 |
| 75. Feeling nervous when you are left alone | 0 1 2 3 4 | 45. 0 1 2 3 4 | 15. 0 1 2 3 4 |
| 76. Others not giving you proper credit for your achievements | 0 1 2 3 4 | 46. 0 1 2 3 4 | 16. 0 1 2 3 4 |
| 77. Feeling lonely even when you are with people | 0 1 2 3 4 | 47. 0 1 2 3 4 | 17. 0 1 2 3 4 |
| 78. Feeling so restless you couldn't sit still | 0 1 2 3 4 | 48. 0 1 2 3 4 | 18. 0 1 2 3 4 |
| 79. Feelings of worthlessness | 0 1 2 3 4 | 49. 0 1 2 3 4 | 19. 0 1 2 3 4 |
| 80. The feeling that something bad is going to happen to you | 0 1 2 3 4 | 50. 0 1 2 3 4 | 20. 0 1 2 3 4 |
| 81. Shouting or throwing things | 0 1 2 3 4 | 51. 0 1 2 3 4 | 21. 0 1 2 3 4 |
| 82. Feeling afraid you will faint in public | 0 1 2 3 4 | 52. 0 1 2 3 4 | 22. 0 1 2 3 4 |
| 83. Feeling that people will take advantage of you if you let them | 0 1 2 3 4 | 53. 0 1 2 3 4 | 23. 0 1 2 3 4 |
| 84. Having thoughts about sex that bother you a lot | 0 1 2 3 4 | 54. 0 1 2 3 4 | 24. 0 1 2 3 4 |
| 85. The idea that you should be punished for your sins | 0 1 2 3 4 | 55. 0 1 2 3 4 | 25. 0 1 2 3 4 |
| 86. Thoughts and images of a frightening nature | 0 1 2 3 4 | 56. 0 1 2 3 4 | 26. 0 1 2 3 4 |
| 87. The idea that something serious is wrong with your body | 0 1 2 3 4 | 57. 0 1 2 3 4 | 27. 0 1 2 3 4 |
| 88. Never feeling close to another person | 0 1 2 3 4 | 58. 0 1 2 3 4 | 28. 0 1 2 3 4 |
| 89. Feelings of guilt | 0 1 2 3 4 | 59. 0 1 2 3 4 | 29. 0 1 2 3 4 |
| 90. The idea that something is wrong with your mind | 0 1 2 3 4 | 60. 0 1 2 3 4 | 30. 0 1 2 3 4 |

Turn the page and follow the directions to complete the additional information.